Fund Managers under Pressure: Rationale and Determinants of Secondary Buyouts

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Abstract

The fastest growing segment of private equity deals are secondary buyouts - sales from one PE fund to another. On a comprehensive sample of 9,575 deals we investigate whether SBOs are value-maximizing or reflect opportunistic behavior. To proxy for adverse incentives, we develop buy and sell pressure indexes based on how close PE funds are to the end of their investment period or lifetime, their unused capital, reputation, deal activity, and fundraising frequency. We report that funds under pressure engage more in SBOs. Pressured buyers pay higher multiples, use less leverage and syndicate less suggesting that their motive is to spend equity. Pressured sellers exit at lower multiples and have shorter holding periods. When pressured counterparties meet, deal multiples depend on differential bargaining power. Moreover, funds that invested under pressure underperform.

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1. Introduction

> *Deal intermediaries in London now use a not very flattering label for fund managers facing pressure to invest their capital promptly: 'desperate housewives'. […] If you are a banker shopping a company, you track down those managers with unspent capital in their aging funds, struggling to extend their investment period and, crucially, who can't raise new money until the tail is gone. They are basically dying to do a deal, at almost any price. Given this flurry of activity [in secondary buyouts], it is hard to resist the conclusion that desperate housewives are indeed at large.*
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> Private Equity International, June 10, 2010

The private equity (PE) industry has enjoyed tremendous growth over three decades, and encompasses now more than 13,000 funds with around 3 trillion dollars of assets under management, mostly dedicated to leveraged buyouts (LBO).[1] Among all PE transactions, the highest rate of growth in recent years corresponds to secondary buyouts (SBOs), deals in which one PE fund sells a portfolio company to a competitor fund. SBOs now constitute more than one-third of observed LBO exits.

Both efficiency and opportunistic motives can potentially explain why so many PE funds choose to invest or exit this way. According to Jensen (1986) PE funds have superior governance structures and incentive mechanisms. It follows that when they engage in secondary transactions, it is likely to be in the best interest of their investors. If, for example, PE funds specialize in different stages of restructuring, then funds specializing in the first stage would sell to those with expertise in the second stage and each fund would create value for its own investors along the way. Alternatively, some general partners (GP) may have unique skills that others do not possess and when their funds acquire firms from other funds, they generate additional returns. For example, more reputable funds may have better access to deal financing.

A second view, in contrast, suggests that part of the growth in secondary deals might be due to self-serving GPs who place their own interest ahead of their investors.[2] On the buy side, when a PE fund has been unsuccessful to invest in traditional deals, it may resort to SBOs that are quicker to complete, fill the fund's investment record, reduce non-invested capital in anticipation of a new round of fundraising, and accrue additional management fees even if the transaction is not in the best interest of the buyer's limited partner (LP) investors. On the sell side, if a PE fund cannot exit an investment via trade sale, merger or IPO, it may sell to another PE fund that was not successful investing in traditional deals.

[1] Source: Preqin, *Private Equity Spotlight* August 2012.
[2] See e.g. The Economist, "*Private-equity companies look to each other to solve their problems*", February 23 2010.

The objective of this paper is to investigate the impact of PE fund incentives on investment decisions and exit outcomes. Using a combination of fund characteristics, we create a Buy Pressure index and a Sell Pressure index, to identify PE funds more likely to be prone to opportunistic behavior. We then analyze in a large buyout sample the investment and exit choices of funds under pressure, as well as transaction multiples, use of leverage, syndication and performance.

To identify which PE funds are susceptible to conflict of interest, we consider the typical contractual provisions in partnership agreements between GPs and LPs. The GPs are expected to invest during the first five years of the fund's life, called the investment period. The management fees are set to provide incentives to invest early, with GPs being paid a percentage of committed capital during the investment period, and a percentage of invested capital during the subsequent period, the harvesting period.[3] However, for PE funds with substantial "dry powder" (unspent capital) close to the end of their investment period this provision creates adverse incentives to enter whatever deal they can. This intuition has been formalized in the optimal contracting model of Axelson, Stromberg and Weisbach (2009).

PE sponsors aim to raise a new fund every three to five years, and their reputation and track record are critical for the ability to start the next fund (Kaplan and Schoar, 2005; Chung, Sensoy, Stern, and Weisbach, 2012). The pressure of being evaluated during each fundraising cycle is part of the GPs' implicit incentive mechanism. As Chung, Sensoy, Stern, and Weisbach (2012) show, a major part of GPs' lifetime compensation is due to expected income from subsequent funds. Prospective LPs not only look at past performance but also at the investment track record of the sponsor's recent funds. If the most recent fund still has a substantial amount of unspent capital at its disposal near the end of its investment period, the LPs are unlikely to commit capital to a new fund. This puts further pressure on PE funds to invest their dry powder. GPs with substantial unspent capital late in their investment period have distorted incentives, and may be inclined to undertake poor investments in order to lock in management fees and boost their investment record. Funds with little reputational capital have more to gain from risk-taking, and hence will have a stronger incentive distortion.

For funds in their harvesting period, the closer they are to the end of their lifetime (typically 10 years) or the more time has passed since their last exit, the more exit pressure they face. PE funds with substantial non-exited investments will be tempted to sell quickly and even at relatively low prices, in order to improve their chances to raise a new fund. If a PE fund cannot exit via a trade sale or IPO, it might strike a deal with another PE fund. Funds with lesser reputation gain more from boosting their record. In case a seller fund under pressure happens to trade with a buyer fund under pressure, the price is likely to be determined by the relative pressure or bargaining power of the parties.

[3] Metrick and Yasuda (2010) document that the contract terms above are very common across all PE funds.

For our identification strategy it is crucial that there is a *dynamic incentive provision* story at play over the fund's lifetime. For funds early in their investment period, the pressure coming from the PE contract is most likely positive and value-enhancing. However, for funds late in the investment period with substantial dry powder, the same contract creates adverse incentives to window dress. As the two-period optimal contracting model of Axelson, Stromberg and Weisbach (2009) demonstrates, funds that invest early only invest in positive NPV projects and will continue to invest only in positive NPV projects late in their investment period (in the second period of the model). In contrast, PE funds that have not found positive NPV investments early are willing to invest in negative NPV projects late in their investment period to keep their management fees and improve their fund raising prospects. Axelson, Stromberg, and Weisbach (2009) predict that it is the combination of fund age and dry powder that makes a fund more likely to invest in negative NPV projects, not one or the other alone.

To test these ideas, we extract from S&P's Capital IQ a comprehensive sample of all closed LBO transactions from 1980 to 2010 with targets located in the U.S. and in 12 European countries. Our sample contains 9,575 LBO transactions involving 8,658 target firms and 957 different PE acquirers. We complement this data with an "event history" of known corporate events (bankruptcies, equity private placements, and mergers) for each LBO company, using information from Capital IQ and on Initial Public Offerings (IPOs) from ThomsonReuters' SDC database. This allows us to identify the type and date of exit of the initial fund for 4,139 exits, of which 1,219 are SBOs.

We construct our Buy Pressure and Sell Pressure indexes from characteristics that jointly identify funds most likely to face adverse incentives and/or conflicts of interests. Following Axelson, Stromberg and Weisbach (2009), we include in our Buy Pressure index proxies for the end of a fund's investment period, and for its unspent capital. We also include proxies for the lack of fund's reputation and the infrequency of the family's fundraising, because opportunistic investment motives are more of a concern for funds without a stellar reputation or that are more uncertain about the outcome of fund raising (Gompers and Lerner, 1999; Kaplan and Schoar, 2005; Chung, Sensoy, Stern and Weisbach, 2012). Similarly, our Sell Pressure index captures how close the fund is to the end of its life, its recent exit activity, its lack of reputation and whether its sponsors are infrequent fundraisers. Our tests are conducted against the alternative hypothesis that SBOs are more likely to be driven by strategies of investor value maximization, i.e. buy and sell pressure would not have any bearing on deal outcomes.

Our findings lend support to the view that agency conflicts help explain the behavior of funds under pressure. We document that secondary deals are more likely to involve buyers under pressure. The regression coefficients indicate that a one standard deviation change in our Buy Pressure index increases the likelihood of SBO from 16.6% to 18%, or about 8.4% of the unconditional probability. We do not find evidence that fund specialization affects the likelihood of secondary deals. Moreover, buy pressure significantly impacts deal valuations. PE funds under pressure pay more in secondary

deals even after controlling for year and industry dummies, firm fixed effects and other fund and deal characteristics. A one standard-deviation shock in the Buy Pressure index increases the purchase multiple (relative to comparable M&A transactions) by about 10.8%. In primary deals, in contrast, buy pressure does not seem to matter: pressured buyers invest at similar multiples as others. These findings are consistent with the prediction of Axelson, Stromberg and Weisbach (2009) that only PE funds with substantial dry powder late in their investment period invest in negative net present value projects.

We also document that exit via SBO is more likely if the seller is under pressure: an increase of one standard deviation in our Sell Pressure index increases the likelihood from 29.5% to 32.1%, an 8.8% increase. Moreover, seller funds under pressure sell at lower transaction multiples in secondary deals with a one standard deviation shock in the Sell Pressure index decreasing the sales purchase multiple by about 13.7 percentage points.

Interestingly, when pressured sellers meet pressured buyers in secondary deals, it is the relative pressure that determines the transaction multiple. In our sample of SBOs we document that less pressured buyers pay lower prices to more pressured sellers and more pressured buyers pay higher prices to less pressured sellers. Our evidence indicates that the difference in the buy and sell pressure indexes affects the two parties' relative bargaining power and the acquisition price. When the two sides face the same pressure, then buy/sell pressure does not matter for pricing of the deal.

The Buy Pressure index also has a negative impact on deal leverage. We find that pressured funds use significantly less leverage (as a fraction of Enterprise Value, Ebitda and Total Assets) and more equity in SBOs. We also document that in SBOs where the lead buyer fund is under pressure to invest the syndicates are smaller with higher deal value per syndicate members. These findings, coupled with the fact that pressured buyers pay higher multiples, is clear evidence in favor of the agency story. If pressured buyers would pay more for SBOs because (say) such deals are less risky, one should find that those deals use more leverage, and not less. Hence, these transactions seem to be driven more by the buyer funds' desire to spend equity than to maximize LP returns.

When GPs use less leverage and pay higher multiples for acquisitions, LPs are likely to get lower returns on their investment. Using IRR data from Preqin and money-on-money fund multiples over a subsample of completed funds, we document that PE funds that made secondary investments under buy pressure during their investment period yield lower IRR and return multiples over the life of the fund. This evidence provides further support that PE funds with high Buy Pressure index values are prone to make opportunistic decisions and invest in negative NPV projects.

A considerable amount of research has been devoted to private equity and LBO activity on a wide variety of questions, including productivity, growth, employment, financial distress and the

performance of PE as an asset class.[4] Our paper is most closely related to studies on the efficiency of PE investments (e.g. Axelson, Jenkinson, Stromberg and Weisbach, 2012). Since our pressure indexes condition on the PE fund's age, our paper also speaks to the effects of limited investment horizon in venture capital and PE (Kandel, Leshchinskii and Yuklea, 2011; Barrot, 2012). Our analysis also adds to recent theory and evidence on window-dressing by PE funds (e.g. Cornelli and Yosha, 2003; Axelson, Stromberg and Weisbach, 2009). Jenkinson, Sousa and Stucke (2013) and Brown, Gredil and Kaplan (2013) document manipulation of NAVs by PE funds during their fundraising cycle. In contrast to the ex-post manipulation of prior investments, our paper focuses on the GPs' opportunism at the time of making investments. Similar to Brown, Gredil and Kaplan (2013), we find that top-performing funds are less likely to be driven by adverse incentives when making investments.

Our paper contributes to a small but growing literature on secondary buyouts. Wang (2012), Jenkinson and Sousa (2012), and Achleitner et al. (2012) find that SBOs are mainly driven by favorable debt market conditions and the state of the IPO market. Bonini (2010), Jenkinson and Sousa (2011), and Wang (2012) analyze operating performance of SBOs and report evidence of underperformance of these deals compared to primary deals. Looking at internal rates of return from a proprietary dataset, Achleitner and Figge (2012) and Achleitner et al. (2012) find no difference in performance between primary and secondary deals. Degeorge, Martin and Phalippou (2013) find that funds underperform in SBOs undertaken at the end of their investment period.

Finally, we connect to empirical work on the impact of PE fund compensation on fund behavior (Gompers and Lerner, 1999; Metrick and Yasuda, 2010; Chung, Sensoy, Stern, and Weisbach, 2012). Robinson and Sensoy (2013) find that, although PE fund fees correlate positively with performance, GP behavior in booms and around certain contractual triggers seems consistent with the existence of agency conflicts. The authors conclude that the agency costs embedded in the GP-LP are bounded away from zero and will manifest themselves in certain circumstances. The findings reported in this paper essentially corroborate this view for funds under pressure.

The remainder of the paper is organized as follows. We develop our hypotheses in Section 2. Section 3 describes the data and variables. Section 4 and 5 analyze the impact of the Buy Pressure and Sell Pressure indexes on the likelihood, the valuation, and the holding period of SBOs. Section 6 explores how differences in pressure of buyer and seller funds affect their relative bargaining position. Section 7 investigates the impact of investing in SBOs under buy pressure on deal leverage, syndication, and on fund performance. Section 8 discusses endogeneity issues, and Section 9 concludes.

[4] See among many others, Kaplan (1989a, 1989b), Smith (1990), Stromberg (2008), Acharya, Gottschalg, Hahn and Kehoe (2013), Phalippou and Gottschalg (2009), Axelson, Jenkinson, Stromberg and Weisbach (2013), Demiroglu and James (2010), Officer, Ozbas, and Sensoy (2010), Boucly, Sraer and Thesmar (2011), Guo, Hotchkiss and Song (2011), and Franzoni, Nowak, and Phalippou (2012).

2. Hypothesis development

2.1. The PE contract and fund incentives

It is useful to begin with a brief description of how PE funds are organized. The management company, or the GP, sets up the fund and makes all investment (buy) and exit (sell) decisions. Their LPs commit to transfer capital to the fund whenever the GP finds an investment opportunity. The LPs play no active role in the fund's management, and have no specific information upfront of the investments the GP will make (i.e., PE funds are "blind-pool" vehicles). The partnership has a lifetime of 10 years (extendable by one or two more), divided into two distinct periods. During the first 5 years, the investment period, the GP selects investments; during the remaining years, the management or harvesting period, the GP manages and eventually exits from those investments.[5]

GPs are compensated by a fixed management fee, typically 1.5% to 2% of committed or invested capital, and a variable component known as carried interest (or carry), corresponding in most cases to 20% of the fund's profits (often a pre-specified hurdle rate must be reached before the GP can receive carry). This convex claim held by the GP aligns the incentives of both parties. Incentives are critically important because LPs are locked in for ten years once the fund closes and have no say in the investment and exit decisions. Apart from eventual distributions coming from exits, the LPs' stake is illiquid: selling it is extremely costly and usually subject to GP approval. The only 'stick' that the LPs possess is the threat not to invest in subsequent funds by the same GPs. This is a strong threat, since the GPs will be out of a job by the end of the current fund's life if future fundraising is unsuccessful.

Based on these contractual features, we develop the following hypotheses regarding the GPs' incentives and investment behavior:

(*i*) *Fund incentives and fund activity*. The GP-LP relationship can be viewed as a principal-agent problem in which an uninformed principal (the LPs) hires a potentially skilled agent (the GP) to trade on his behalf.[6] Investors learn about the GP's ability by observing his past and current deal activity. The agent might therefore engage in suboptimal actions in an attempt to influence the principal's beliefs. In Dow and Gorton (1997), for example, the agent trades too much in order to show activity to his employer.[7] In the PE context, this leads to the prediction that GPs with substantial amounts of unspent capital ("dry powder") will more likely engage in suboptimal acquisitions, to

[5] So called follow-on investments, usually acquisitions made by companies already in the fund's portfolio, are allowed during the harvesting period, but these are typically limited to at most 10% to 15% of the fund's size and in many funds they require authorization by the LPs.

[6] See e.g. Berk and Green (2004).

[7] This 'excessive trade' equilibrium holds because the LPs cannot distinguish between a situation in which the GP exerts effort but finds no suitable investment opportunities, and an alternative scenario in which the GP shirks and simply consumes the fixed fee.

create investment record and use up capital. This theory also implies that funds in the harvesting period which have not shown exit activity for some time will be tempted to engage in suboptimal sales transactions to improve their exit record.

One might argue that the incentives implicit in the partnership agreement should be sufficient to alleviate the agency problem. However, as Axelson, Stromberg and Weisbach's (2009) show, these incentives may not work equally well for all funds. The contract, which provides correct incentives to most GPs, exacerbates distortions for GPs unable to invest early, and such GPs will be willing to spend their capital on negative NPV projects late in their investment period.

(*ii*) *Fund incentives and stage of fund lifecycle*. The management fee structure may create adverse incentives to overinvest. Metrick and Yasuda (2010) report that for 84% of buyout funds, the management fee is paid as a percentage of committed capital during the investment period but as a percentage of invested capital during the harvesting period. They simulate data based on observed PE contracts and find that the fixed compensation represents a large portion (roughly 60%) of the NPV of the GP's income. Therefore, GPs close to the end of the investment period face a tradeoff. If a potential target is somewhat overvalued and the GP invests, the fund's IRR suffers. On the other hand, by passing up the deal, the GP loses the management fee as their basis shifts from committed capital to invested capital. Based on Metrick and Yasuda's findings, one would expect that the temptation to overinvest is likely to be particularly strong for funds close to the end of their investment period.

For funds in the harvesting period, pressure accumulates as the end of the fund's life approaches. Although sometimes investors allow so-called 'zombie' funds to continue, the GP's reputation suffers when one of its funds operates beyond its expected lifetime.

(*iii*) *Fund incentives and fund reputation*. The temptation to engage in suboptimal deals discussed above is likely to be more severe for managers that still need to build their reputation. First, the incentive to gamble is highest for funds with little reputational capital (Ljungqvist, Richardson, and Wolfenzon, 2008; Gompers, 1996). Second, high-reputation GPs presumably also have higher skills (e.g. Kaplan and Schoar, 2005), and are able to spot good investment opportunities early in the fund's life. Third, LPs' beliefs about GP ability are less (more) likely to be affected by a single bad deal or a temporary bout of inactivity if the GP's reputation is strong (weak). We therefore predict that funds with less reputation are more likely to engage in suboptimal transactions, both as buyers or sellers.

(*iv*) *Fund incentives and fund raising frequency*. Chung, Sensoy, Stern and Weisbach (2012) argue that GPs have strong incentives to maximize the prospects of successful future fundraising, as the flow of fees associated with the future assets under management can be a substantial part of the GPs wealth. The fund raising process for the typical fund lasts between 12 to 24 months, and requires a substantial GP effort in terms of time, monetary outlays, and management attention. Arguably, the

expected likelihood of success in raising a future fund is a function of the GP's experience in the fund-raising process. GPs that have completed the process more frequently are more likely to have a large pool of potential investors, a more professional approach to fund raising, and access to intermediaries such as placement agents. Conversely, GPs with infrequent fundraising experience are more likely to be dependent on their track record to woe investors and therefore more tempted to window dress their current performance. This leads to the prediction that infrequent fund raisers are more likely to engage in suboptimal deals, both as buyers and as sellers.

2.2. Fund incentives and SBOs

One important feature of SBOs relative to primary deals is that they are easier and quicker to execute. First, a secondary buyer saves on search costs, because the target has already been pre-screened by the primary investor. Second, SBOs are faster to complete relative to divisional deals (in which the decision by the corporate parent might be more convoluted or involve intermediaries), delistings of public firms (in which the buyer has to comply with regulations and possible hold-out by minority shareholders), or sales of standalone private firms (often family firms in which the emotional attachment or conflicts within the family can delay the sale). Third, SBOs are probably easier to finance since a substantial amount of information is available from the primary deal (debt documentation, due diligence, financial reporting systems). Furthermore, lenders are likely to be familiar with the target and the same banks may be willing to continue to fund it after the secondary transaction. Exactly the same arguments hold for sellers, making SBOs probably the quickest way to exit a portfolio investment.

In general, SBOs could be done for opportunistic motives or for efficiency reasons.

On one hand, secondary buyouts are particularly attractive for funds that wish to conclude a deal quickly and therefore constitute a prime choice for GPs with misaligned incentives. We hypothesize that GPs are more likely to engage in secondary deals for agency reasons: (*i.a*) as buyers if they have more dry powder, and (*i.b*) as sellers if they haven't shown recent exit activity; (*ii.a*) as buyers if the end of their investment period is close, and (*ii.b*) as sellers if the end of the harvesting period is close; (*iii*) if they have not established a strong reputation of a "top quartile" fund for which performance persistence is frequently assumed; (*iv*) if the GP is an irregular or infrequent fundraiser. In terms of deal pricing we would expect buyers (sellers) doing acquisitions because of distorted incentives to be willing to pay higher (receive lower) transaction multiples. We further predict that, in case two pressured GPs are counterparties in an SBO, their relative opportunism determines the excess multiple of the deal.

On the other hand, SBOs could be efficient transactions for GPs who maximize investor value. First, PE funds might have different skills that are adapted to different target types. For example, organic strategies based on professionalization of business practices are frequent in smaller primary targets, while M&A-driven internationalization strategies are more important for restructuring larger secondary targets (e.g. Acharya et al., 2013). Similarly, PE funds might specialize in certain industries. This leads to the prediction that fund specialization would impact the likelihood of executing an SBO. Second, more reputable funds may have access to more leverage at cheaper rates, so investing in secondary deals would create additional value for these funds. This view would predict that more reputable funds are more likely to invest in SBOs, the opposite to the prediction implied by the agency view. In terms of deal pricing, we would predict that investor-value-maximizing GPs would pay (receive) no excess multiples in secondary deals relative to primary deals.

3. Data and empirical testing issues

This section describes in general terms our sample and variables. Appendix A provides the details about the sample construction and Appendix B the full list of variables and their definitions.

3.1. Sample construction

We extract from S&P's Capital IQ database all closed LBO transactions with targets located in the U.S. and in 12 European countries (Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Spain, Sweden, Switzerland, and U.K.) for the period ranging from January 1st, 1980 to December 31st, 2010. As a first set of filters we exclude targets in financial industries, acquisitions of minority stakes or of remaining interest, deals involving targets with reported negative sales or negative enterprise value, and misclassified non-PE related transactions such as corporate acquisitions, purchases of stakes by hedge funds, and venture capital deals. On this initial sample of 23,032 deals we implement Stromberg's (2008) methodology to obtain an imputed Enterprise Value for transactions without deal value information (roughly 60% of the sample). This involves running a Heckman regression model with the likelihood of a deal having its value disclosed in the first stage, and the determinants of target Enterprise Value in the second stage (see Table A-1 in the Appendix for results and details). This imputed value is used to compute market shares and activity measures of PE fund families required in the analysis.

We then apply a second set of filters excluding: deals without Capital IQ identifiers of buyers and sellers; acquisitions by management teams (management buy-outs) with no evidence of involvement by a PE sponsor; deals in which the target firm is bankrupt or in financial distress; and

transactions with a deal value lower than one million dollars.[8] When an acquisition involves multiple stages or transactions, we keep the one in which the buyer acquired most of its stake (typically the first transaction). We also require that we can reasonably trace the purchase to a given fund within a PE fund family under mild assumptions (see below). The final sample contains 9,575 LBO deals involving 8,658 target firms and 957 different PE acquirers.

To obtain the exit of each LBO transaction, we download from Capital IQ data on corporate events related to each target firm (bankruptcies, equity private placements, and mergers) using each firm's unique identifier. We complement this data with information on Initial Public Offerings (IPOs) from ThomsonReuters' Securities Data Corporation (SDC) database. We then construct an "event history" of known corporate actions for each firm after the LBO, allowing us to identify the type and date of exit of the initial LBO investor. We say that an exit takes place if there is evidence of a change in control (e.g., sale of a majority stake) even if the original buyer funds remain minority shareholders. The final sample contains 4,139 exits, of which 1,219 are secondary LBOs.

3.2. Buy Pressure index and related variables

We extract from Capital IQ buyer and seller information that we use to create a unique PE fund family identifier to group fund-level information (again see the Appendix A for details). We identify the "leading buyer" in a multi-buyer transaction as the PE fund family with the highest reputation among the deal's buyers, measured as the dollar market share across all LBO deals made up to that year.[9] For single-buyer transactions, the "leading buyer" (henceforth, the buyer) is the PE fund family of the acquiring fund. We then match each LBO deal with information on the buyer's existing funds. We check if the LBO's acquisition date is within the investment period range (e.g., years 1 through 6) of at least one of the funds in the PE fund family. If the condition is not fulfilled, we discard the LBO transaction because that is a sign that fund-level information in Capital IQ about the family is incomplete. If the condition is fulfilled, we assume that the deal is performed by the fund family's youngest fund still investing at the time of the deal. The time in the fund's lifecycle at which the deal is made (that is, the number of years elapsed since the raising of the buyer's fund) is recorded in the variable *Stage*.

To capture buy pressure, we create an index from characteristics that are likely to identify funds desperate to invest. The first element of the index is the variable *Late Buyer*, an indicator

[8]All monetary amounts in this paper are in real December 2010 dollars, values in European currency having been converted to U.S. dollars at historical exchange rates.

[9]We also compute market shares of PE fund families using three other backward-looking horizons, 3, 5, and 10 years. In the overwhelming majority of cases the ranking of fund families, and thus the leading buyer, is the same. In very small number of cases in which the different horizons produce different results, we take the buyer with the highest average among the all horizons.

variable equal to 1 if the buyer's fund is at the end of its investment period (that is, 4 to 6 years after inception) at the time of the deal, and zero otherwise. The second element is the variable *Dry Powder.* For each PE fund family and year, we calculate: (i) the aggregate amount that was raised in the past 3 years and the corresponding median that was raised across fund families in that year; (2) the aggregate dollar value of all investments made during the past three years, and its corresponding median. Using these two quantities, we define *Dry Powder*, a dummy variable equal to 1 if the buyer's PE fund family is above median in terms of fund raising and below median in terms of deal activity. Third, we define *Lack of Reputation*, an indicator variable equal to 1 if the buyer is not in the top quartile of funds in terms of deal volume market share. Fourth, we define *Infrequent Fundraiser*, an indicator variable equal to 1 if the average fundraising frequency of the PE firm until the year of the deal is in the bottom quartile of all PE firms.

The index variable *Buy Pressure* is the sum of the four dummy variables Dry Powder, Late Buyer Lack of Reputation, and Infrequent Fundraiser. To identify buyers under particularly acute pressure, we define *High Buy Pressure,* an indicator variable equal to 1 if at least two of the four components of our Buy Pressure index are equal to 1. The indicator variable Low Buy Pressure takes the value 1 if the reverse holds.

Finally, to control for fund family characteristics, we introduce two control variables: *Affiliated*, a dummy variable equal to 1 if the fund family is affiliated to a financial institution or government agency, and zero otherwise; and *Novice*, an indicator variable equal to 1 if the buyer is from a PE fund family with 3 funds or less under management at the time of the LBO deal, and zero otherwise.

3.3. Sell Pressure index and related variables

As mentioned before, we extract from Capital IQ buyer and seller information that we use to create a unique PE fund family identifier to group fund-level information. The "leading seller" at exit is the PE fund family initially identified as leading buyer, and for consistency we assume that the seller (within the family) is the same fund that made the investment at the time of the initial transaction.[10]

To capture sell pressure, we create an index from characteristics likely to identify funds desperate to exit. Our Sell Pressure index is comprised of four binary variables: *Late Exit* is an indicator variable equal to 1 if three years or more elapsed since the PE fund family last exited an

[10]In a few cases, LBOs are marked as secondary deals in Capital IQ but no information related to the primary deal exists. In this case we replicate the process described above for the buyer, that is, we compute market shares among sellers in a deal to select the leading seller, and require that the sale takes place during the lifecycle (i.e. years 1 through 10) of at least one fund in the selling family to compute seller-related variables. The selling fund is then defined as the oldest active fund (i.e. less than 11 years old) in the selling fund family.

LBO deal; *Late Seller* is a dummy variable that takes the value of 1 if the exit takes place in year 9 or 10 of the life of the selling fund, and zero otherwise; *Lack of Reputation*, an indicator variable equal to 1 if the buyer is not in the top quartile in terms of deal volume market share; *Infrequent Fundraiser*, an indicator variable equal to 1 if the average fundraising frequency of the PE firm until the year of the deal is in the bottom quartile of all PE firms. We then define our index of *Sell Pressure* as the sum of the four indicator variables Late Exit, Late Seller, Lack of Reputation and Infrequent Fundraiser. To isolate sellers under acute pressure, we define the indicator variable *High Sell Pressure*, equal to 1 if at least two of the four Sell Pressure index components are equal to one. Similarly, the variable *Low Sell Pressure* takes the value of 1 if at most one of the four Sell Pressure index components is equal to 1. For completeness, we also compute *Novice at Exit*, an indicator variable equal to 1 if at the time of exit from the LBO deal the buyer is a PE fund family with 3 funds or less under management and zero otherwise.

3.4. Other variables

The set of controls in our regression specifications includes several variables. *Imputed TEV* is the target's enterprise value, that is, the sum of equity market value (valued at the offer price) and the target's pre-deal net debt (financial debt minus cash and marketable securities). Enterprise value, like all monetary amounts in this paper, is measured in real December 2010 U.S. dollars after conversion at historical exchange rates (exchange rates and inflation rates are obtained from the FRED Economic data of the Federal Reserve Bank of St. Louis). *Management Participation*, *U.S. dummy*, and *Syndicated* are dummy variables that indicate, respectively, that management is a shareholder of the acquiring group, the target is a U.S. firm, and there is more than one buyer. To proxy for capital market conditions we include *HY Spread*, the difference between interest rates on leveraged loans and on AAA-rated bonds, and *Cold IPO Market*, an indicator variable equal to 1 if the geography-, industry-adjusted IPO dollar volumes are below their time series average.

The dependent variables in the tests for valuations of acquisitions, *Excess Sales Multiple* and the *Excess Ebitda Multiple* are constructed as follows. We first compute for each LBO deal the *Sales Multiple* (*Ebitda Multiple*) as the ratio between Enterprise Value (TEV) and latest available yearly sales (Ebitda) for the target firm at the time of the LBO. Multiples are constructed only when the deal value is non-missing, that is, Imputed TEVs are not used in this calculation. To obtain the benchmarked variables, we subtract from each multiple the median sales (Ebitda) multiple by geography (U.S. versus Europe), industry (Fama-French 12-industry classification), and public status (public or private), of all merger transactions from ThomsonReuters' SDC over the previous two years relative to the date of the LBO.

For tests involving exit, we construct similar variables but as of the time of exit (*Exit HY Spread*, *Exit Cold IPO Market*, and *Exit Excess Sales* (*Ebitda*) *Multiple*). One additional variable specific to exit regressions is *Add-ons*, a dummy variable equal to one if there were significant acquisitions during the time that the buyer held the target firm in its portfolio.

3.5. Summary statistics

Table 1 presents the main characteristics of our LBO sample. Panel A shows that the average (imputed) Enterprise Value is $277 million (M) (USD), while the median is $87M. Management is part of the acquiring group 44.1% of the time, and slightly more than half of our deals refer to U.S. targets. Our proxy for "dry powder" indicates that buyers have significant capital available 22.9% of the time. About 21.5% of LBO deals are made by Late Buyers (in the last years of the investment period), 69.5% by fund families outside the top quartile in deal volume, and 25.2% by Infrequent Fundraisers. For the average (median) fund the value of our Buy Pressure index is 1.39(1), while 41.1% of the LBO deals are executed by funds under High Buy Pressure. For completeness, Panel A displays the proportions of other LBO types present in the sample: 53.5% of deals involve private sellers ("private-to-private") and 19.4% are corporate divestitures ("divisional" buyouts).

Panel B of Table 1 presents summary statistics for our valuation variables (recall that valuation measures are only available if the deal value is known and the accounting item entering the multiple is also available). The average Sales Multiple (Ebitda Multiple) for LBOs in our sample is 1.36 (9.37), while their Excess equivalent, net of median transaction multiples, is 0.25 (-1.41).

Finally, Panels C and D of Table 1 present statistics for exits. Note that 29.5% of the LBOs in our sample are exited through a secondary deal, the second most frequent form of exit after trade sales (48%). About 11% of exited deals involved large add-on acquisitions. About 10% of the sellers last exited a deal three or more years ago, 12.5% sold at the end of the fund's lifetime, 76.7% of exits involved sellers lacking reputation, and 20.8% were infrequent fund raisers. Our Sell Pressure index shows a mean (median) value of 1.20 (1), and 29.9% of the sellers exited under High Sell Pressure. Turning to valuations, the average Sales Multiple at exit is 1.82 and the average Ebitda Multiple is 10.82, somewhat higher than the corresponding entry valuations. The same holds for the excess sales multiple (excess Ebitda multiple) that reach 0.73 (0.81).

4. Secondary buyouts and the pressure to invest

4.1. Secondary buyouts: univariate comparisons

To highlight the systematic differences between primary and secondary LBOs, Table 2 displays univariate comparisons of means and medians of our variables between these deals. Panel A shows that, relative to non-secondary LBOs, secondaries are larger both in mean and in median, and management participates more often as equity holder (all differences statistically significant at 1%). Secondary buyouts are more likely to occur when credit spreads are relatively lower, and when IPO markets are cold (all differences again statistically significant at 1%).

Panel A of Table 2 also presents a preview of the results for our main variables of interest. We report that secondary LBOs more often involve (1) buyers with dry powder (26.2% of the time versus 22.3% for non-secondaries, statistically significant at 1%), (2) buyers late in their investment cycle (23.9% versus 21.0%, statistically significant at 1%), (3) infrequent fund raisers (27.1% versus 24.8%, statistically significant at 5%). By contrast, there is no perceptible difference in the lack of reputation (69.8% versus 69.5%, which is not statistically significant). The Buy Pressure index is therefore higher for secondaries (1.470 versus 1.375, statistically significant at 1%). The table also shows that affiliated buyers do secondaries relatively more often, and novice funds less often than other deals. This shows the importance of controlling for these fund characteristics in our analysis.

Panel B reports the differences in valuation between the two types of deals. The table shows that secondary deals are more expensive than other LBOs across all valuation measures employed. For example, the average secondary transaction in our sample was priced at a sales (Ebitda) multiple of 1.589 (10.184), about 22.9% (10.8%) higher than for other deals. The results for the benchmarked excess multiples are similar (all differences statistically significant at the 5% or 1% level).

4.2. Secondary buyouts: multivariate analysis

We run a multivariate logit regression to test the hypothesis that PE fund characteristics proxy for investment incentives and predict secondary transactions:

$$y_{1,i} = \alpha_1 + \beta_1 \times \text{Buy Pressure}_i + \gamma_1 \mathrm{X}_i + \varepsilon_i \qquad y_{1,i} = \begin{cases} 0 \text{ if } y^*_{1,i} \le 0 \\ 1 \text{ if } y^*_{1,i} > 0 \end{cases} \qquad (1)$$

The dependent variable, y_i, is an indicator that takes value 1 if deal *i* is a secondary buyout and 0 if the LBO is a primary deal. **X** represents the matrix of control variables defined in Section 3.4. All

regression specifications include industry and year dummies, and we cluster standard errors by deal year.[11]

Column 1 of Panel A in Table 3 presents the results from estimating the logistic model for our basic specification. The coefficient of Buy Pressure is positive and highly significant (*t*-statistic 3.04). This suggests that pressured buyers do proportionally more secondary deals. The marginal effect of Buy Pressure is 0.014, also significant at 1%, implying that an increase of one standard deviation in Buy Pressure represents an increase in the probability of doing a secondary exit of about 0.014× 0.98 = 1.4%. This is an 8.4 percent increase relative to the unconditional mean of the likelihood of a secondary buyout (equal to 16.6% from Table 1). Column 2 of Panel A presents results for High Buy Pressure which has a virtually identical level of significance (*t*-statistic 3.31). Column 3 decomposes the Buy Pressure index into three dummy variables, representing the index being equal to 1, 2, or at least 3. The coefficients are monotonically increasing as expected, and all three dummies are significant at 1%, 5% or 10%, respectively. Column 4 introduces PE firm fixed effects to account for any unobserved GP heterogeneity that is not controlled for in our specification. The coefficient of Buy Pressure is significant at the 5% level, and slightly larger than the coefficient of column 1.[12]

Regarding control variables, the table shows that targets of secondary LBOs are larger than primary deals (with t-statistics between 10 and 20) and have management equity participation more often (t-statistics ranging between 4 and 6). Secondary transactions seem to be somewhat less prevalent in the U.S. compared to Europe (t-statistics around -2.5). The results remain virtually unchanged when we run the regression on the subsample of LBOs with valuation information (not reported in tables).

Panel B of Table 3 presents results for the individual components of our Buy Pressure index as the main independent variables. All coefficients show a positive loading, with statistically significant *t*-statistics ranging from 1.7 (Late Buyer), significant at 10%, to 2 (Infrequent Fundraiser), 2.06 (Dry Powder) and 2.3 (Lack of Reputation), the latter three significant at the 5% level.

4.3. Likelihood of secondary deals and buyer specialization

So far our findings suggest that buy pressure plays a role in funds' investment decisions, but at least two alternative stories can explain why some funds might prefer to engage in secondary deals. These stories are linked to the view that SBOs are efficient transactions.

[11] We have also replicated all our tables using double clustering by deal year and PE firm. Significance levels are basically unchanged.

[12] Marginal effects are not shown in column 4 because they cannot be computed in a fixed-effects logit regression. The reason is that the marginal effects depend on the value of the fixed effects, which are not estimated.

The first story relates to fund specialization. Practitioners argue that PE funds have different skills that are adapted to different target types. Compared to primary targets, secondary targets are larger, more mature, and have survived the first leveraging up. Funds might specialize in different types of targets leveraging their specific skills, and this matching could partially explain our results. Similarly, PE funds might specialize in certain industries as industry-specific knowledge of operations and technology might be critical for successfully growing or turning around target companies.

To test this hypothesis, we add two proxies for buyer specialization to our model. The first proxy is a set of three indicator variables related to Size Specialization, that take the value 1 if the buyer's past deals are particularly focused (more than two thirds) in a particular LBO size category.[13] The second proxy is Industry Specialization, an indicator variable equal to 1 if a significant percentage of the buyer's past deals (33%) are in the same industry as the target.

Table 4 presents the estimation of the logit model with the specialization variables in columns 1 through 3. The specification includes the same set of control variables as well as industry and year dummies. The results do not support the specialization hypothesis. All the coefficients of the specialization variables are statistically insignificant with signs opposite to what one would expect. The first two columns show that funds specialized in an industry are not more likely to make a secondary deal, whether measured by a dummy (Column 1) or the percentage of their deals (Column 2) in their specialist industry, and that funds specialized in large deals are less, rather than more, likely to purchase a secondary target (but the coefficients are not statistically significant). Notably, the coefficient of the Buy Pressure index is positive and statistically significant throughout. Column 3 shows that the coefficients on size specialization are also insignificant.

The second alternative story suggests that the likelihood of secondary deals is determined by industry- or market-specific conditions. Although we control for industry and time effects, some within-industry time varying factors could potentially affect our results. We focus on two possible explanations. The first possibility is that anti-trust concerns might affect the frequency of secondary deals. Secondary LBOs are relatively larger firms, which might face anti-trust hurdles if bought by a trade buyer, while simultaneously not being large enough to be sold through an IPO. Hence in the presence of substantial industry concentration, the only exit route for a seller would be to exit through a secondary LBO. We therefore use as a control Industry Concentration, the geography- and year-adjusted Herfindahl concentration index in the target's industry. The second possibility is that changes in industry capital asset liquidity might explain the likelihood of secondary deals, by changing the pool of available trade buyers over time. We therefore use as control the Asset Liquidity measure proposed by Schlingemann, Stulz and Walkling (2002), defined as the target industry's ratio of the

[13] We define a deal as small (medium) [large] if the deal has an imputed enterprise value lower than 50 million (between 50 and 250 million) [more than 250 million] in real 2010 U.S. dollars. These cutoffs roughly correspond to standard practitioner categorizations used by PE trade associations.

value of corporate transactions (excluding LBOs) to the value of the total assets of public firms in that industry. Column 4 of Table 4 presents these alternative stories. The coefficients of Industry Concentration and Asset Liquidity are indistinguishable from zero, and the coefficient on the Buy Pressure index is unchanged in statistical and economic magnitude. The result is the same if we include Industry Concentration and Asset Liquidity separately in our regressions, or alter the definition of the concentration or asset liquidity variables (not reported in tables).

4.4. Valuation of secondary buyouts

Our empirical analysis documented that the Buy Pressure index predicts the likelihood of SBOs. Next we focus on deal pricing. To gauge valuation effects, we run the following least-squares regression in the sample of deals with valuation information:

$$XSMULT_i = \alpha_2 + \delta_2 \times \text{Buy Pressure}_i + \beta_2 \times \text{Buy Pressure}_i \times D_i^{SEC} + \phi_2 \times D_i^{SEC} + \gamma_2 X_i + \varepsilon_i \quad (2)$$

where *XSMULT*, the dependent variable, is one of our two measures of deal valuation (Excess Sales Multiple or Excess Ebitda Multiple) and D^{SEC} is an indicator variable that takes the value 1 if the deal is a secondary transaction and 0 otherwise. We focus our attention on β_2, the coefficient on the interaction term Buy Pressure × D^{SEC} that measures the impact of our Buy Pressure index for secondary deals. As before, **X** represents the matrix of control variables, but with one exception: we replace TEV (which is part of our Sales Multiple definition) with an instrument for deal size, represented by Buyer Size, the log value of all deals made by the buyer in the last 5 years. All specifications include industry and year dummies and year-clustered standard errors.

Panel A of Table 5 presents very consistent results, both in Panel A.1 (Sales Multiple) and Panel A.2 (Ebitda Multiple). For brevity we focus the discussion on the Excess Sales Multiple in Panel A.1 (The results of Panel A.2 on Excess Ebitda Multiple are similar in magnitude and somewhat stronger in terms of statistical significance). The coefficient δ_2 that measures the impact of our Buy Pressure index on deal value is negative but not statistically significant (coefficient -0.05, *t*-statistic 1.45) in all specifications. This implies that buyers under pressure do not pay more for primary targets. In contrast, our coefficient of interest β_2, on the interaction of Buy Pressure index and secondary transaction, is positive and statistically significant throughout. In Column 1, we find significance at the 5% level for the Buy Pressure index (coefficient 0.200, *t*-statistic 2.61), indicating that PE funds under pressure pay higher multiples for SBOs. Taking the difference between these coefficients and multiplying by a one-standard deviation shock of 0.98 in Buy Pressure, we obtain a change of 0.147 in Excess Sales Multiple, equivalent to an increase of 10.8% with respect to the sample average of Sales Multiple (1.36 from Table 1).

Column 2 shows virtually identical results for buyers under acute pressure, the High Buy Pressure variable. Column 3 displays fully monotonic coefficients for the Buy Pressure index in three level groups, for values 1, 2, or 3 and higher. Column 4 includes PE firm fixed effects.

In Panel B of Table 5, we show regression results for each of the four individual components of our Buy Pressure index. In Panel B.1 (Sales Multiple) late buyers tend to pay less for primary acquisitions (*t*-statistic -1.74); all other components are not significant. Again, the focus of our analysis is on the interaction terms. While the results are weaker than those for the composite index, the interaction terms Dry Powder × D^{SEC}, Lack of Reputation × D^{SEC} and Infrequent Fund Raiser × D^{SEC} are positive and statistically significant at the 5% and 10% level, respectively, while the interaction Late Buyer × D^{SEC} is not statistically distinguishable from zero. In Panel B.2 (Ebitda Multiple), Late Buyer and Infrequent Fundraiser switch significance, but otherwise the findings are similar. Purchase prices are positively associated with our proxy for deal size and negatively related to management equity participation, although statistical significance varies.

5. Exits via secondary buyouts and the pressure to sell

5.1. Determinants of the secondary buyout exit route

We run a multivariate logistic model to test the hypothesis that PE fund characteristics proxy for investment incentives and predict secondary exits:

$$y_{3,i} = \alpha_3 + \beta_3 \times \text{Sell Pressure}_i + \gamma_3 \mathrm{X}_i + \varepsilon_i \qquad y_{3,i} = \begin{cases} 0 \text{if } y^*_{3,i} \le 0 \\ 1 \text{if } y^*_{3,i} > 0 \end{cases} \qquad (3)$$

The dependent variable, y_3 is an indicator variable that takes value 1 if deal *i* is exited via SBO and 0 for other types of exits. We modify the control variable matrix **X** by adding as controls: Stage, the time in the fund's life when the target was originally bought; Add-On, an indicator of significant build-ups under the seller's control; and dummy variables identifying the original deal's source, that is, whether it was a secondary deal, a divisional buyout, a public-to-private deal, or a sale by a financial institution (the missing category is that of a private-to-private deal). In addition, some of our variables, like Novice, HY Spread, and Cold IPO Market, are now calculated as of the date of exit.

The results are presented in Panel A of Table 6. Column 1 shows that pressured sellers are more likely to exit through SBO (coefficient 0.133, t-statistic 3.99). The marginal effect of the Sell Pressure index is 0.026. Given that the standard deviation of the Sell Pressure index in the exit sample is 0.795, a one standard-deviation shock in Sell Pressure would increase the likelihood of an exit via SBO by 2.1%, or about 7.1% of the average sample frequency of secondary exits. Column 2 shows similar results, significant at 1%, when we focus on the High Sell Pressure index, and Column 3

shows that coefficients are monotonically increasing when the Sell Pressure index is separated into 4 dummies for levels equal to 1, 2, or 3 and higher. Turning to our control variables, the results in Table 6 show that the initial deal source is a strong determinant of exit type, with SBOs highly likely to follow secondary deals (*t*-statistics in the range of 2.8, for all but one specification) while targets originally divested by corporate sellers or in public-to-private transactions are less likely to be sold to another PE fund. In addition, market conditions matter: the variable HY Spread is negative and statistically significant (*t*-statistic -4.97), indicating that at times of high credit spreads exit via SBO is more difficult. The results are the same for the subsample of LBOs with valuation information (not reported in tables).

Panel B reports results for the four components of the Sell Pressure index separately. Three of the four components Late Seller, Last Exit, Lack of Reputation increase the sales price, at 1% and 10% level of significance, respectively, with *t*-statistics ranging from 1.75 (Last Exit) to 2.60 (Late Seller). Infrequent Fundraiser is insignificant with a positive sign. The control variables exhibit virtually unchanged coefficients and *t*-statistics.

5.2. Holding period of secondary buyouts

The strategic considerations of seller funds are likely to influence several aspects of the exit decision: the exit route (sale in SBO versus an alternative), acceptable sale price, as well as exit timing. In this subsection, we investigate the timing of the exit decision, and its interaction with the Sell Pressure index. Exit timing can be synonymously understood as the duration, or holding period, of each portfolio firm.

We hypothesize that, if the pressure to exit increases, so does the probability of an SBO exit at any given period. We undertake a duration analysis of portfolio firms sold via a secondary deal, using a competing risk model:

$$HOLPER_{i,t}^{SBO} = \delta_4 \times \text{Sell Pressure}_{i,t} + \gamma_4 \mathrm{X}_{i,t} + \varepsilon_{i,t} \tag{4}$$

The model estimates the hazard of an exit ('failure') through an SBO in the presence of other competing exits (trade sales, IPOs, etc.) and of censored observations (those deals that at the end of our sample are still without an exit). We emphasize that the model is truly dynamic, since the independent variables are time-varying. As a portfolio company stays longer in the portfolio of a PE fund, the Sell Pressure index evolves according to the fund's history, dropping if the fund exits another portfolio company or manages to raise a new fund, and rising otherwise.

Table 7 presents the estimation results using hazard ratios, such that a coefficient larger than one indicates a positive impact on the hazard rate and hence a lower expected conditional duration. Column 1 of Table 7 shows that the probability of an SBO exit increases with our Sell Pressure index

at a 1% level of significance (*t*-statistic 4.50). We find a similar sign and strong significance if we use the High Sell Pressure dummy instead (column 2). In column 3, we address the history dependence of Sell Pressure, and the fact that it may rise as well as fall, by creating two new variables. The dummy variable *Increase in Sell Pressure* takes the value 1 if, at a given time *t* during the holding period, the current Sell Pressure is higher than the value of the same Sell Pressure prevailing at the time when the portfolio firm was acquired (this value is denoted *Sell Pressure at Entry*). We find that both the initial value of Sell Pressure and a subsequent increase of it during the holding period increase the probability of an SBO exit in each period at a level of significance of 1%. Finally, the reader might wonder if the buy pressure faced by the GP at entry also plays a role in divesting the company faster. We find that, even though *Buy Pressure at Entry* positively affects expected duration (*t*-stat. 1.75), the variable Increase in Sell Pressure is still positive and significant at the 1% level. We conclude that the sell pressure of PE funds has a strong impact on the holding period of investments exited via SBOs.

5.3 Valuation of secondary buyout exits

Our empirical analysis provided evidence that the Sell Pressure index is associated with higher likelihood for secondary deals by PE funds. Next we investigate the relationship between sell pressure of PE funds and deal pricing. We run the following regression model:

$$XSMULT_i^{EXIT} = \alpha_5 + \delta_5 \times \text{Sell Pressure}_i + \beta_5 \times \text{Sell Pressure}_i \times \text{D}_\text{i}^{\text{SECEXIT}} + \phi_5 \times \text{D}_\text{i}^{\text{SECEXIT}} + \gamma_5 \text{X}_i + \varepsilon_i \quad (5)$$

The dependent variable $XSMULT^{EXIT}$ is a measure of valuation at the time of the exit using either Sales or Ebitda as the basis of the excess multiple. $D^{SECEXIT}$ is an indicator variable that takes value 1 if the LBO is exited through a sale to another PE fund and 0 otherwise. The matrix **X** includes control variables measured at the time of exit, as in Section 5.1, and we also replace TEV (part of the multiple) with an instrument for deal size, represented by Buyer Size. All specifications include industry dummies, year dummies, and year-clustered standard errors.

The regression results are reported in Table 8. As before, the variable of interest is the interaction term Sell Pressure × $D^{SECEXIT}$. In Column 1, the coefficient β_5 of this interaction is negative and clearly significant, at 1% in Panel A.1 where the Exit Excess Sales Multiple is the dependent variable (coefficient -0.324, *t*-statistic -4.22), and at 5% in Panel A.2, for the Exit Excess Ebitda Multiple (coefficient -2.396, *t*-statistic -2.60). These findings show that Sell Pressure has a negative impact on the transaction price, as stipulated in our theoretical argument. Again taking the difference between coefficients and multiplying by a one standard deviation shock of 0.795 in Sell Pressure, we obtain a change of 0.249 in Excess Sales Multiple, equivalent to an increase of 13.7% with respect to the sample average of Sales Multiple at exit (1.82 from Table 1). Column 2 shows comparable results for the High Sell Pressure index (albeit at 10% significance for the second dependent variable, Exit

Excess Ebitda Multiple). In Column 3, the Sell Pressure index is decomposed in three level dummy variables demonstrating a monotonic increase in coefficients throughout. Finally, column 4 shows that our results are robust to the inclusion of PE firm fixed effects.

In Panel B of Table 8, we analyze the four individual components of the Sell Pressure index separately in columns 1 through 4. The interaction terms of interest are statistically significant for each component in the two panels, with the exception of *Irregular Fund Raiser* × $D^{SECEXIT}$ in Panel B.2. where it is not statistically significant but still has the right sign. We conclude that, within the set of secondary exits, the pressure to exit depresses valuations in secondary deals in ways comparable to our evidence on the price impact of the Buy Pressure index.

6. Buy pressure and sell pressure: which effect dominates?

Our empirical analysis documented that buyers under pressure are more likely to do SBOs and when they do, pay higher prices. We also found that sellers under pressure are more likely to exit at lower multiples via secondary sale. Hence, both buyers and sellers under pressure experience adverse price impact in SBOs. The interesting question is what happens when a pressured buyer meets a pressured seller as these effects could potentially offset each other if the pressure status of the deal counterparty is not properly controlled for. They can also present an opportunity for funds under pressure: trying to match with a counterparty that is equally under pressure would appear as a natural hedging strategy against the pricing risk to which a fund under pressure is exposed.

In unreported results we find little evidence in favor of assortative matching between buyers and sellers according to their pressure status. In the sample of transactions in which we can identify both buyer and seller, the correlation index of the Buy and Sell Pressure indexes is -1% and statistically undistinguishable from zero. Only 8% of the deals have a match of a seller with High Sell Pressure with a buyer with High Buy Pressure. These possible matches represent about 16% of the deals made by High Buy Pressure buyers, and less than a third of the deals made by High Sell Pressure sellers. Thus, there is no evidence for deliberate matching to mitigate the price impact.

Given the opposite signs of the Buy Pressure and Sell Pressure indexes on deal valuation, if buyers and sellers with various pressure indexes are matched, which effect dominates? We estimate a model for the valuation of secondary LBOs within the subsample of exits for which we have information about buyers' status, sellers' status, and deal valuations. We include as explanatory variables our Buy Pressure and Selling Pressure indexes simultaneously, as well as the control variables used in Section 5.2 above.

The results are displayed in Table 9. In column 1, we include the Buy Pressure and Sell Pressure indexes on the sample of SBO deals in which we can identify both parties. The price impact

of Buy Pressure is positive and statistically significant at the 1%, whereas the price impact of Sell Pressure is negative, albeit only at 10% of significance. In columns 2 and 3, we interact in turns each pressure index (for buyers in column 2 and for sellers in column 3) with the dummy variables of high and low pressure of the counterparty (respectively, sellers in column 2 and buyers in column 3). We find that when a high pressure PE fund is matched with a low pressure counterparty, the low-pressure counterparty has the bargaining power and moves the price in its favor. For example, the interaction Buyer Pressure × Low Sell Pressure has a positive and significant coefficient (0.219, *t*-statistic 4.30) indicating that the impact of Buyer Pressure is particularly strong with the GP faces a low pressure seller. The converse is also true (coefficient of Seller Pressure × Low Buy Pressure negative and significant coefficient at the 1% level). When both parties face high pressure, their bargaining power is equal and neither has an impact on the transaction multiple.

These results are confirmed in column 4, where we interact the high/low pressure dummies of each counterparty, in order to have all possible categorical outcomes of pressure (High Buy Pressure × High Sell Pressure, High Buy Pressure × Low Sell Pressure, etc.). The base omitted category is Low Buy Pressure × Low Sell Pressure. We find again that it is in the cases in which this relationship is unbalanced that there is an impact of pressure on prices.

The magnitude of the coefficients, and the relatively weaker statistical significance of Sell Pressure in column 1, indicate that seller funds appears to have somewhat higher bargaining power relative to buyer funds. This finding also supports the prediction of Axelson, Stromberg and Weisbach (2009) that buyer funds with substantial dry powder late in their investment period are willing to invest at any price and even in negative NPV projects.

7. Buy pressure in secondary deals: leverage, syndication and fund performance

7.1. Buy pressure and leverage in secondary deals

We documented that PE funds under buy pressure are more likely to engage in SBOs and when they do, they pay higher valuation multiples. To further investigate the motives of these funds, we now focus on the relationship between buy pressure and deal leverage in secondary transactions.

Concerning secondary deals, on the supply side lenders face lower information costs for companies that are already LBO targets, and are presumably willing to lend more to firms that were able to carry more debt than in their first LBO. Moreover, secondary deals are often considered less risky, and as such, they can support a higher debt load. On the demand side, as shown in Axelson et al. (2012), Bonini (2012), Wang (2012), and Achleitner et al. (2012), SBO activity is generally high when debt financing costs are low. Moreover, if secondary deals demand higher multiples because

they are less risky, these deals would be expected to have even higher debt capacity. Hence, on the basis of the above reasoning, one would predict that secondary deals would be more levered on average. Interestingly, however, existing evidence on deal leverage of SBOs is at best mixed. Among the previous papers investigating SBOs, only Achleitner and Figge (2011) document higher leverage in SBOs whereas Bonini (2012) and Wang (2012) report lower leverage.

If, however, the motive for engaging in secondary deals is the buy pressure of PE funds, measuring the desire to spend their dry powder and to improve the prospect of future fundraising, then one would expect to find a negative relationship between buy pressure and deal leverage. PE funds under buy pressure should be eager to put their capital to use, and prefer to execute a deal with spending more of their equity than other PE buyers, because their opportunity cost of doing so is lower and their primary motive for executing the deal is to draw down their dry powder.

To decide between these competing hypotheses, we investigate the relation between deal pressure and deal leverage for secondary deals. We use three different leverage metrics: the ratio of senior debt to enterprise value at the onset of an LBO deal, the ratio of debt to Ebitda, and the ratio of debt to total assets. Information on senior debt, defined as the sum of all term debt facilities used in the deal, is obtained from multiple sources including Capital IQ, DealScan, Dealogic, and company filings in the case of public-to-private deals.

Columns 1 to 3 in Table 10 report the results for each of the three different leverage ratios. Our main variable of interest is the interaction term Secondary × Buy Pressure. It is negative and statistically significant for all three leverage variables, with *t*-statistics ranging from -1.69 to -2.12. This provides support for the agency view that secondary deals by pressured buyers are aimed at spending the fund's dry powder rather than maximize their LP returns. The Buy Pressure index alone is not significant in our regressions suggesting that in primary deals Buy Pressure does not have significant explanatory power with respect to deal leverage. In our sample, secondary LBOs have somewhat higher debt levels than other deals (the coefficient for Secondary is positive and statistically significant in two of the three equations), as expected from the supply side forces at play.

7.2. Buy pressure and syndication in secondary deals

After documenting that PE funds under buy pressure are more likely to engage in SBOs and when they do, pay higher prices and use less leverage, we now turn to the relationship between buy pressure and deal syndication. There should be a connection between the use of leverage and syndication: In order to increase the use of their own capital in a deal, funds can employ less debt financing, but they can also rely less on syndicate partners to co-invest in the deal.

Thus, if pressured PE funds invest to lock in management fees and reduce their unspent capital, they should prefer to spend more of their own equity in the SBOs rather than share the deal. Funds under buy pressure should be less likely to syndicate their SBOs, or be inclined to form smaller syndicates with higher deal value per syndicate members. On the other hand, if PE funds are motivated by efficiency considerations, then the equity that they commit to individual deals should determined by deal and firm characteristics, macro-variables, industry, and year effects. Since secondary deals are typically larger than primary deals, one would expect in this case that SBO syndicates are not significantly smaller than syndicates for other deal types.

Our empirical analysis utilizes three measures of syndication: an indicator variable if the deal is syndicated (involves more than one buyer); the size of the syndicate, that is, the number of syndicate members involved in the acquisition; and the deal value per syndicate member, that is, the imputed equity value of the deal divided by the number of buyers. Columns 1 to 3 in Table 11 report the results for each of the three different measures of syndication. Regarding the control variables, larger deals and deals with management participation are positively related to all measures of syndication. Affiliated funds also seem to engage in syndicated deals more often.

Our main variable of interest is the interaction term Secondary × Buy Pressure. It is negative and statistically significant for syndicate size at the 5% level (with *t*-statistics -2.3), positive and statistically significant for value per syndicate member at the 5% level (with *t*-statistics 2.31), and negative but not statistically significant for likelihood of syndication. The signs of all three coefficients are in line with the agency view that PE funds under pressure are motivated primarily by spending their own equity in SBOs.

7.3. Buy pressure and fund performance

Our analysis provides strong evidence that pressured funds are more likely to invest in SBOs, pay higher valuation multiples, use lower leverage and rely less on syndicate finance. This evidence lends support to the prediction of Axelson, Stromberg and Weisbach (2009) that PE funds with substantial dry powder and lesser reputation late in their investment period are inclined to make negative NPV investments. However, we cannot yet exclude that these transactions may still be value-maximizing for investors. This could be the case for example if pressured funds pay higher multiples in secondary buyouts but are able to sell these companies at even higher multiples when they exit, in other words if pressured SBO deals select high-value companies. Therefore, we consider in our final investigation the effect of SBO activity under buy pressure on fund performance.

We explore this issue by analyzing overall fund returns. We utilize aggregate fund-level performance data from Preqin for completed funds. We construct a new variable, Average Buy Pressure, defined as the mean value of the PE fund's Buy Pressure index over the life of the fund. The

Average Buy Pressure is higher for funds with substantial dry powder late in their investment period, for less reputable funds, for funds that are infrequent fundraisers and lower for PE funds that invest most of their capital early in the investment period, for reputable funds and for fund families that raise funds with regular frequency. We use several metrics for PE fund performance, such as IRR (the internal rate of return of the fund) and Multiple (the money multiple of the exit value relative to the acquisition price), both commonly used in the industry. To avoid the influence of extreme winners or losers, we also use the rank versions of IRR and Multiple. Our specification and set of controls is inspired by the literature on PE performance (e.g., Kaplan and Schoar, 2005).

The results for each performance metric are displayed in Table 12 from column 1 through column 4, respectively. We find that in all cases Average Buy Pressure has a negative impact on fund performance, statistically significant in 3 out of 4 cases: at the 5% level (Multiple rank) and at the 10% level (IRR and Multiple). Table 12 provides further evidence that pressured funds are more likely to make negative net present value investments and yield their investors lower returns over the life of the fund. Since pressured funds are more likely to invest via SBOs, this finding is also consistent with evidence in Bonini (2012) that portfolio companies perform worse with their second and subsequent PE owner than with their primary PE acquirer.

8. Endogeneity issues

In most studies on the behavior of PE funds or financial intermediaries, endogeneity is an important concern as the econometric relationships might be driven by unobserved hidden variables. For example, taking the result that secondary buyouts typically have higher valuations (e.g. Wang, 2012), a potential concern is that some funds could have a simultaneous preference for secondary buyouts and for relatively expensive deals, and hence be spuriously identified as willing to invest in SBOs and pay relatively high prices, or that secondary buyouts select companies that are less risky, and hence command higher prices. Then the link between value and SBO would not be causal but would reflect unobserved GP or company characteristics.

We cannot rule out this scenario, but we point out that our research design addresses many of these concerns. First, we do not explain SBO activity per se, but only its relationship to our measures of incentive distortions. Our Buy Pressure and Sell Pressure indexes are time-varying, and the same GP is typically present in our data with deals under pressure, and deals without pressure. This reduces the possible impact of unobservable fund-level characteristics on our relationship of interest. Similarly, even though certain companies might be preferred in SBOs, there is little reason to believe that they are systematically different in SBOs under pressure compared with SBOs without pressure.

Second, we use in our specifications a large number of control variables capturing a wide array of portfolio company characteristics, fund characteristics, and market conditions. We find that these covariates, while often significant, do not alter the relationship between our variables of interest.

Third, and more importantly, throughout the analysis we include PE firm fixed effects, taking advantage of the panel nature of our data. These fixed effects should be able to pick up any endogeneity that arises from underlying unobservable firm-level characteristics jointly generating the relationships explored in this paper. Our findings are robust to the inclusion of these fixed effects. We find that the significance level of our covariates of interest rarely weakens.[14]

In addition, we exploit the fact that each SBO has two PE equity funds as counterparties, both of which could potentially be under pressure. Focusing on our valuation relationships (this analysis cannot be done for the logit regressions), we look at the pressure index "on the other side" of the deal by controlling for the pressure index "on this side" of deal. As discussed in Section 6, both the buyer and the seller fund might be under pressure and the difference in the buy and sell pressure influences the deal valuation. Most importantly, we find no evidence in favor of assortative matching between sellers and buyers according to their pressure status. In other words, in an SBO the probability that a buyer is under pressure seems to be orthogonal to the probability that the seller is under pressure. Therefore, we isolate the impact of the pressure index of the deal counterparty as a reasonably exogenous variation that should be orthogonal to the characteristics of the PE firm and the portfolio company. Thus, the impact of the randomly drawn pressure index of the counterparty should be much less concern for endogeneity.

9. Conclusion

This paper investigates the private equity contract's impact on the investment decisions and exit outcomes of funds. We focus on secondary buyouts, an increasingly important and growing segment of the LBO market. We investigate to what extent these deals are motivated by efficiency considerations or opportunistic behavior induced by the PE contract. We stipulate that contract incentives affect PE funds' propensity to engage in secondary deals, the valuation multiples they pay/accept, the deal leverage and syndicate size. We develop Buy Pressure and Sell Pressure indexes that reflect the end of a fund's investment period / life, its unspent capital/deal inactivity, its reputation, and how often its fund family raises funds from investors.

[14] Note that fixed effects in our some of our specifications drastically reduce the degree of freedom. In the valuation regressions, the ratio of the number of observations to the number of GPs is rather low: the average GP has less than two observations. The use of GP fixed effects might represents a case of over fitting. Nevertheless we document the fixed effects specification in the analysis to exploit its potential in addressing endogeneity issues.

We construct a comprehensive sample from one of the largest available databases of PE transactions; it involves a diverse set of GPs and LPs and hence reduces the risk of selection bias inherent in proprietary datasets obtained from a few highly reputable LPs. Using a sample of 9,575 U.S. and European LBO deals, we find strong evidence that pressured buyers and sellers are more likely to engage in SBOs. Participation of a pressured seller (buyer) moves the transaction multiple significantly lower (higher) even after controlling for market conditions and firm characteristics. When pressured buyers meet pressured sellers in a secondary transaction, it is the relative pressure between the two that affects their relative bargaining power and the deal price. We also find that pressured buyers use less leverage and rely on smaller deal financing syndicates. Finally, on a subsample of completed deals we report that funds with higher average buy pressure have lower IRR and return multiple over the life of the fund. Our findings provide strong support for the prediction of Axelson, Stromberg and Weisbach (2009) that PE funds with substantial unspent capital late in their investment period are more likely to make negative NPV investments.

By providing an in-depth analysis of the impact of the incentives from PE contractual provisions on deal type, deal prices and deal terms, our paper contributes to the literature on PE investments, as well as to the literature on agency conflicts between fund managers and investors. We show how positive incentives early in a fund's life turn into adverse incentives later, corroborating the notion that agency costs are inevitable even in a sophisticated contractual environment such as the one of private equity (Robinson and Sensoy, 2013). Our findings should also have implications for investment and exit decisions in other segments of the ever-growing fund management industry. The more illiquid the asset base of a fund, the more likely should be the occurrence of the agency-driven effects that we document for the case of secondary buyouts.

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Table 1

Summary Statistics

This table presents summary statistics for the sample used in this study. Panel A presents the summary statistics data for our deal-entry level panel. The definitions of the main variables are as follows (for other variables please see Appendix B). Secondary is an indicator variable with value 1 if the seller in a deal is a PE fund. Imputed TEV of the target firm is the sum of the target's equity market value valued at the LBO offer price and the target's net debt. For transactions without deal value information, we compute an estimate of deal value using the methodology of Stromberg (2008). Buy Pressure is the sum of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser. Dry Powder is an indicator variable equal to 1 if the buyer is above median in terms of fund raising and below median in terms of deal activity (see Appendix B for details). Late Buyer is an indicator variable with value 1 if the buyer's most recent fund at the time of the deal is at the end of its investment period (4 to 6 years after inception). Lack of Reputation is an indicator variable equal to 1 if the buyer is below the 75th percentile in terms of rank of value-weighted market share, computed using all deals made from 1980 up to deal year. Infrequent Fund Raiser is an indicator variable equal to 1 if the buyer's average time between fund raisings is more than 3 years. Panel B presents the variables used to measure valuation of the deal at the time of entry. Sales (Ebitda) Multiple is the ratio between TEV and latest available yearly sales (Ebitda) for the target firm at the time of the LBO. These variables only take non-missing values when deal value is known. Excess Sales (Ebitda) Multiple is the difference between the target's Sales (Ebitda) Multiple and a valuation benchmark constructed as a follows. For every year, geography (U.S. versus Europe), industry (Fama-French 12-industry classification) and public status (public or private), we compute the median sales (Ebitda) multiple for all merger transactions with value larger than 1 million dollars involving a majority stake over the previous two years relative to the date of the LBO. Panel C describes the characteristics at the time of exit. Secondary Exit is an indicator variable equal to 1, if the exit route of the LBO is a sale to another PE fund or group of PE funds. Add-ons is equal to 1, if there were significant acquisitions during the time that the buyer held the target firm in its portfolio. Stage is the number of years elapsed since fund raising for the youngest fund in the PE fund family whose investment period overlaps with the LBO deal date (that is. whose deal date falls within years 1 through 6 of the lifetime of the fund). Sell Pressure is the sum of variables Exit Pressure, Late Seller, Lack of Reputation, and Infrequent Fund Raiser. Last Exit is equal to 1 if three or more years have elapsed since the PE fund family last exited an LBO deal. Late Seller is an indicator variable with value 1, if the sale takes place in years 9 or 10 of the PE fund family's oldest active fund (i.e. less than 11 years old). Panel D describes the valuation variables at the time of exit (see Panel B above for a description of the variables). All monetary values are measured in real December 2010 U.S. dollars, after conversion at historical exchange rates.

Panel A. LBO characteristics						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Secondary	9,575	0.166	0.372	0	0	0
Imputed TEV	9,575	277.0	1280.4	41.7	87.1	184.9
Mgmt. participation	9,575	0.441	0.497	0	0	1
U.S. target	9,575	0.507	0.500	0	1	1
HY Spread	9,575	3.81	2.06	2.38	3.03	4.55
Cold IPO Market	9,575	0.520	0.500	0	1	1
Buy Pressure	9,575	1.391	0.980	1	1	2
High Buy Pressure	9,575	0.411	0.492	0	0	1
Dry Powder	9,575	0.229	0.420	0	0	0
Late Buyer	9,575	0.215	0.411	0	0	0
Lack of Reputation	9,575	0.695	0.460	0	1	1
Infrequent Fund Raiser	9,575	0.252	0.434	0	0	1
Affiliated	9,575	0.200	0.400	0	0	0
Novice	9,575	0.506	0.500	0	1	1
Divisional	9,575	0.194	0.396	0	0	0
Financial seller	9,575	0.055	0.228	0	0	0
Public to private	9,575	0.050	0.217	0	0	0
Private to private	9,575	0.535	0.499	0	1	1

Panel B. LBO Valuation at Entry						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
TEV	1,373	885.8	2790.5	59.7	207.5	689.2
Sales Multiple	1,373	1.36	1.16	0.59	1.02	1.73
Excess Sales Multiple	1,373	0.25	1.09	-0.40	0.02	0.65
EBITDA Multiple	671	9.37	4.74	6.26	8.40	11.59
Excess EBITDA Multiple	671	-1.41	5.77	-3.94	-1.56	1.11

Panel C. LBO characteristics at Exit						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Secondary Exit	4,139	0.295	0.456	0	0	1
Add-ons	4,139	0.112	0.316	0	0	0
Stage	4,139	2.309	1.344	1	2	3
HY Spread	4,139	3.76	2.18	2.35	2.92	4.55
Cold IPO Market	4,139	0.560	0.496	0	1	1
Sell Pressure	4,139	1.202	0.795	1	1	2
High Sell Pressure	4,139	0.299	0.458	0	0	1
Last Exit	4,139	0.125	0.331	0	0	0
Late Seller	4,139	0.101	0.302	0	0	0
Lack of Reputation	4,139	0.767	0.423	1	1	1
Infrequent Fund Raiser	4,139	0.208	0.406	0	0	0
Affiliated	4,139	0.185	0.388	0	0	0
Novice	4,139	0.375	0.484	0	0	1
Down Exit	4,139	0.101	0.301	0	0	0
M&A Exit	4,139	0.477	0.500	0	0	1
IPO Exit	4,139	0.128	0.334	0	0	0

Panel D. LBO Valuation at Exit						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
TEV	1,090	819.2	1680.0	106.3	316.4	832.6
Sales Multiple	1,090	1.82	1.47	0.83	1.44	2.36
Excess Sales Multiple	1,090	0.73	1.33	-0.13	0.41	1.24
EBITDA Multiple	582	10.82	5.09	7.40	9.47	13.54
Excess EBITDA Multiple	582	0.81	6.01	-1.86	0.34	3.73

Table 2
Univariate Comparisons: Secondary Deals vs. Non-Secondary Deals

This table presents univariate tests of significance of LBO characteristics and valuation between Secondary and Non-secondary deals. A LBO deal is defined as Secondary if the seller in the deal is a PE fund and non-secondary otherwise. Panel A presents the tests for our entry panel. Panel B presents the variables used to measure valuation of the deal at the time of entry. All variables are defined in the caption of Table 1 and in Appendix B. All monetary values are measured in real December 2010 U.S. dollars, after conversion at historical exchange, rates. *t*-tests for differences in means and medians are reported (where applicable), and the symbols ***, **, * denote significance at 1%, 5% and 10% respectively.

Panel A. Univariate Comparisons: LBO characteristics

	Secondary Deals			Non-secondary Deals				
Variable	N	Mean	Median	N	Mean		Median	
Imputed TEV	1,593	362.1	212.0	7,982	260.0	***	74.2	***
Mgmt. participation	1,593	0.504	1	7,982	0.429	***	0	
U.S. target	1,593	0.471	0	7,982	0.514	***	1	
HY Spread	1,593	3.49	2.83	7,982	3.87	***	3.21	***
Cold IPO Market	1,593	0.587	1	7,982	0.506	***	1	
Dry Powder	1,593	0.262	0	7,982	0.223	***	0	
Late Buyer	1,593	0.239	0	7,982	0.210	***	0	
Lack of Reputation	1,593	0.698	1	7,982	0.695		1	
Infrequent Fund Raiser	1,593	0.271	0	7,982	0.248	**	0	
Buy Pressure	1,593	1.470	1	7,982	1.375	***	1	
High Buy Pressure	1,593	0.451	0	7,982	0.403	***	0	
Affiliated	1,593	0.234	0	7,982	0.193	***	0	
Novice	1,593	0.401	0	7,982	0.527	***	1	

Panel B. Univariate Comparisons: LBO Valuation at Entry

	Secondary Deals			Non-secondary Deals				
Variable	N	Mean	Median	N	Mean		Median	
TEV	333	652.4	332.6	1,039	960.6	*	180.3	***
Sales Multiple	333	1.589	1.333	1,039	1.293	***	0.958	***
Excess Sales Multiple	333	0.589	0.325	1,039	0.140	***	-0.067	***
EBITDA Multiple	143	10.184	9.517	528	9.193	**	8.000	***
Excess EBITDA Multiple	143	-0.401	-0.235	528	-1.603	**	-1.885	***

Table 3
Likelihood of a Secondary Deal

This table presents results of a logistic regression in which the dependent variable is an indicator variable with value 1 if the seller in a deal is a PE firm. The explanatory variable of interest is the Buy Pressure index, the sum of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser. Panel A presents results for Buy Pressure and its variants. Panel B presents results for the individual components of the Buy Pressure index. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors are clustered by deal year. *t*-statistics are reported in parentheses. Numbers in square brackets indicate marginal effects (shown for the explanatory variables of interest). The symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A. Buy Pressure Index								
Dependent variable: Secondary Deal Indicator								
	(1)		(2)		(3)		(4)	
Buy Pressure	0.097	***					0.127	**
	[0.014]						(2.50)	
	(3.04)							
High Buy Pressure			0.205	***				
			[0.025]					
			(3.31)					
Pressure = 1					0.195	*		
					[0.022]			
					(1.75)			
Pressure = 2					0.321	***		
					[0.037]			
					(2.64)			
Pressure >=3					0.393	**		
					[0.046]			
					(2.53)			
Imputed TEV	0.673	***	0.674	***	0.672	***	0.771	***
	(19.70)		(19.60)		(19.45)		(20.23)	
Mgmt. Participation	0.453	***	0.454	***	0.453	***	0.336	***
	(5.77)		(5.73)		(5.75)		(4.55)	
U.S. Target	-0.158		-0.150		-0.157		-0.504	***
	(-1.58)		(-1.51)		(-1.57)		(-3.00)	
Novice	0.051		0.050		0.057		-0.039	
	(0.70)		(0.67)		(0.74)		(-0.30)	
Affiliated	0.242	***	0.207	***	0.259	***	0.427	
	(2.86)		(2.64)		(3.05)		(1.45)	
Past LBO activity	0.934	**	0.93	**	0.935	**	0.949	***
	(2.57)		(2.53)		(2.56)		(3.21)	
HY Spread	-0.036	**	-0.036	**	-0.036	**	-0.026	
	(-2.31)		(-2.32)		(-2.35)		(-0.90)	
Cold IPO Market	-0.021		-0.021		-0.022		0.069	
	(-0.15)		(-0.15)		(-0.16)		(0.64)	
Intercept	-9.716	***	-9.635	***	-9.775	***	-0.722	***
	(-10.13)		(-9.88)		(-9.89)		(-7.70)	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.15		0.15		0.15		0.17	
N	9,575		9,575		9,575		7,731	

Table 3
Likelihood of a Secondary Deal (cont.)

Panel B. Buy Pressure Index Individual Components								
Dependent variable: Secondary Deal Indicator								
	(1)		(2)		(3)		(4)	
Dry Powder	0.155	**						
	[0.019]							
	(2.06)							
Late Buyer			0.123	*				
			[0.015]					
			(1.70)					
Lack of Reputation					0.19	**		
					[0.022]			
					(2.30)			
Infrequent Fund Raiser							0.167	**
							[0.02]	
							(2.00)	
Imputed TEV	0.673	***	0.676	***	0.671	***	0.678	***
	(19.18)		(19.48)		(19.19)		(19.84)	
Mgmt. Participation	0.463	***	0.461	***	0.46	***	0.455	***
	(5.74)		(5.74)		(5.74)		(5.65)	
U.S. Target	-0.139		-0.146		-0.149		-0.145	
	(-1.39)		(-1.49)		(-1.47)		(-1.44)	
Novice	0.074		0.047		0.083		0.028	
	(1.04)		(0.65)		(1.09)		(0.41)	
Affiliated	0.166	**	0.159	**	0.252	***	0.179	**
	(2.37)		(2.30)		(2.83)		(2.33)	
Past LBO activity	0.913	**	0.92	**	0.942	**	0.948	***
	(2.48)		(2.50)		(2.56)		(2.61)	
HY Spread	-0.035	**	-0.035	**	-0.035	**	-0.035	**
	(-2.22)		(-2.28)		(-2.26)		(-2.21)	
Cold IPO Market	-0.021		-0.019		-0.031		-0.028	
	(-0.15)		(-0.14)		(-0.22)		(-0.20)	
Intercept	-9.604	***	-9.596	***	-9.794	***	-9.668	***
	(-9.84)		(-9.76)		(-9.99)		(-10.00)	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.15		0.15		0.15		0.15	
N	9,575		9,575		9,575		9,575	

Table 4
Likelihood of a Secondary Deal: Fund Specialization

This table presents a logistic regression in which the dependent variable is an indicator variable with value 1 if the seller in a deal is a PE firm. The explanatory variables of interest are the industry specialization of the buyer (Industry Specialization Dummy, Industry Specialization %), the size segment specialization of the buyer (specialization in small, mid, or large LBOs), and industry related variables (Concentration, Asset Liquidity) and the Buy Pressure index. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors are clustered by deal years. *t*-statistics are reported in parentheses and ***, **, * denote significance at 1%, 5% and 10%.

Dependent variable: Secondary Deal Indicator								
	(1)		(2)		(3)		(4)	
Buy Pressure	0.122	***	0.124	***	0.128	***	0.121	***
	(3.01)		(3.12)		(3.34)		(3.01)	
Industry Specializ. Dummy	-0.022							
	(-0.20)							
Industry Specializ. (%)			-0.231					
			(-1.01)					
Small Size Specialization					0.028			
					(0.13)			
Medium Size Specialization					-0.08			
					(-1.21)			
Large Size Specialization					-0.121			
					(-1.24)			
Industry Concentration							0.429	
							(0.89)	
Industry Asset Liquidity							1.067	
							(0.99)	
Buyer Size	0.673	***	0.674	***	0.649	***	0.672	***
	(19.84)		(19.68)		(14.82)		(19.56)	
Mgmt. Participation	0.453	***	0.451	***	0.47	***	0.453	***
	(5.83)		(5.76)		(5.88)		(5.82)	
U.S. Target	-0.157		-0.156		-0.065		-0.165	*
	(-1.53)		(-1.56)		(-0.68)		(-1.65)	
Novice	0.241	***	0.242	***	0.252	***	0.241	***
	(2.86)		(2.84)		(3.34)		(2.85)	
Affiliated	0.052		0.053		0.034		0.053	
	(0.71)		(0.73)		(0.40)		(0.73)	
Past LBO Activity	0.935	***	0.936	***	1.055	***	0.904	**
	(2.59)		(2.58)		(3.22)		(2.47)	
HY Spread	-0.036	**	-0.036	**	-0.033	*	-0.036	**
	(-2.32)		(-2.28)		(-1.72)		(-2.26)	
Cold IPO Market	-0.021		-0.021		-0.072		-0.008	
	(-0.15)		(-0.16)		(-0.48)		(-0.06)	
Intercept	-9.721	***	-9.708	***	-9.478	***	-9.684	***
	(-10.16)		(-10.10)		(-11.62)		(-10.07)	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.15		0.15		0.14		0.15	
N	9,575		9,575		8,139		9,564	

Table 5
Valuation of Secondary Deals

This table presents regression results of the relation between LBO valuation multiples and Buy Pressure. Panel A shows results for Excess Sales Multiples using the Buy Pressure index and its variants, while Panel B does the same using the individual components of the Buy Pressure index. Panels C and D use Excess Ebitda Multiple as the dependent variable. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors are clustered by deal year to accommodate heteroscekedasticity and within-year autocorrelation. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A. Buy Pressure Index								
A.1. Dependent variable: Excess Sales Multiple								
	(1)		(2)		(3)		(4)	
Buy Pressure	-0.050						-0.093	
	(-1.45)						(-1.60)	
Secondary*Buy Pressure	0.200	**					0.161	**
	(2.61)						(2.04)	
High Buy Pressure			-0.066					
			(-1.05)					
Secondary*High Buy Pressure			0.414	**				
			(2.60)					
Pressure = 1					-0.088			
					(-0.78)			
Pressure = 2					-0.096			
					(-0.83)			
Pressure >=3					-0.199			
					(-1.51)			
Secondary*(Pressure = 1)					0.273			
					(1.41)			
Secondary*(Pressure = 2)					0.666	***		
					(2.83)			
Secondary*(Pressure >= 3)					0.482	*		
					(1.73)			
Secondary	0.083		0.190	*	0.002		0.068	
	(0.54)		(1.85)		(0.01)		(0.49)	
Buyer Size	0.078	***	0.078	***	0.077	***	0.033	
	(4.19)		(4.17)		(4.11)		(0.67)	
Mgmt. Participation	-0.049		-0.048		-0.049		-0.051	
	(-1.34)		(-1.35)		(-1.30)		(-0.65)	
U.S. Target	-0.109	*	-0.11	*	-0.111	*	-0.177	
	(-1.86)		(-1.90)		(-1.91)		(-1.24)	
Novice	0.062		0.065		0.061		0.163	
	(0.75)		(0.80)		(0.74)		(1.14)	
Affiliated	-0.107	**	-0.099	**	-0.115	**	0.195	
	(-2.37)		(-2.28)		(-2.40)		(0.74)	
Past LBO activity	0.361	*	0.353	*	0.321		0.400	
	(1.79)		(1.74)		(1.52)		(1.33)	
HY Spread	-0.014		-0.015		-0.015		0.009	
	(-0.97)		(-1.09)		(-1.11)		(0.30)	
Cold IPO Market	-0.011		-0.01		-0.014		-0.056	
	(-0.15)		(-0.13)		(-0.18)		(-0.51)	
Intercept	-0.883		-0.908		-0.755		-2.170	
	(-1.53)		(-1.55)		(-1.29)		(-1.45)	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.11		0.11		0.11		0.12	
N	1,373		1,373		1,373		1,065	

Table 5
Valuation of Secondary Deals (cont.)

Panel A. Buy Pressure Index								
A.2. Dependent variable: Excess Ebitda Multiple								
	(1)		(2)		(3)		(4)	
Buy Pressure	-0.452						-0.409	
	(-1.42)						(-0.85)	
Secondary*Buy Pressure	1.869	***					1.438	**
	(3.48)						(2.00)	
High Buy Pressure			-0.664					
			(-1.18)					
Secondary*High Buy Pressure			3.433	***				
			(3.46)					
Pressure = 1					-0.559			
					(-0.82)			
Pressure = 2					-0.808			
					(-0.81)			
Pressure >=3					-1.676			
					(-1.67)			
Secondary*(Pressure = 1)					2.889	*		
					(1.75)			
Secondary*(Pressure = 2)					5.408	**		
					(2.85)			
Secondary*(Pressure >= 3)					6.078	***		
					(3.28)			
Secondary	-1.696	*	-0.462		-2.648		-2.196	*
	(-1.72)		(-0.59)		(-1.63)		(-1.74)	
Buyer Size	0.128		0.123		0.128		-0.069	
	(1.24)		(1.24)		(1.35)		(-0.16)	
Mgmt. Participation	-0.733		-0.695		-0.741		-0.393	
	(-1.49)		(-1.45)		(-1.61)		(-0.62)	
U.S. Target	0.144		0.075		0.091		0.796	
	(0.17)		(0.08)		(0.10)		(0.62)	
Novice	0.427		0.393		0.413		-0.202	
	(1.01)		(0.95)		(0.97)		(-0.17)	
Affiliated	-0.586		-0.527		-0.559		2.706	
	(-0.85)		(-0.74)		(-0.87)		(1.25)	
Past LBO activity	0.762		0.754		0.856		0.744	
	(0.24)		(0.25)		(0.27)		(0.27)	
HY Spread	-0.08		-0.083		-0.08		-0.03	
	(-0.99)		(-0.99)		(-0.85)		(-0.11)	
Cold IPO Market	0.087		0.172		0.184		-0.842	
	(0.12)		(0.23)		(0.25)		(-0.87)	
Intercept	-5.444		-5.876		-6.030		-1.822	
	(-0.31)		(-0.35)		(-0.35)		(-0.11)	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.06		0.06		0.06		0.05	
N	671		671		671		525	

Table 5
Valuation of Secondary Deals (cont.)

Panel B. Buy Pressure Index Components								
B.1. Dependent variable: Excess Sales Multiple								
	(1)		(2)		(3)		(4)	
Dry Powder	-0.004							
	(-0.06)							
Secondary*Dry Powder	0.280	**						
	(2.27)							
Late buyer			-0.162	*				
			(-1.74)					
Secondary*Late Buyer			0.246					
			(1.49)					
Lack of Reputation					0.039			
					(0.43)			
Secondary*Lack of Reputation					0.217	*		
					(1.78)			
Infrequent Fund Raiser							-0.131	**
							(-2.21)	
Secondary*Irreg. Fund Raiser							0.283	**
							(2.11)	
Secondary	0.290	***	0.312	***	0.219	*	0.302	***
	(2.89)		(2.93)		(1.74)		(2.84)	
All other controls	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.11		0.11		0.11		0.12	
N	1,373		1,373		1,373		1,373	
B.2. Dependent variable: Excess Ebitda Multiple								
	(1)		(2)		(3)		(4)	
Dry Powder	0.045							
	(0.10)							
Secondary*Dry Powder	2.475	*						
	(1.81)							
Late buyer			-0.975					
			(-1.45)					
Secondary*Late Buyer			2.212	*				
			(1.60)					
Lack of Reputation					-0.960			
					(-1.24)			
Secondary*Lack of Reputation					2.901	*		
					(1.87)			
Infrequent Fund Raiser							-0.353	
							(-0.50)	
Secondary*Irreg. Fund Raiser							1.428	
							(0.96)	
Secondary	0.424		0.608		-0.964		0.832	
	(0.47)		(0.87)		(-0.70)		(1.30)	
All other controls	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.06		0.05		0.06		0.05	
N	671		671		671		671	

Table 6
Likelihood of Secondary Exits

This table presents results of a logistic regression, where the dependent variable is a Secondary Exit, an indicator variable with value 1 if the exit route of the LBO is a sale to another PE fund or group of PE funds. The main explanatory variable is the Sell Pressure index. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors are clustered by year. T-statistics are reported in parentheses. Numbers in square brackets indicate marginal effects (shown for the explanatory variables of interest). The symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A. Sell Pressure Index								
Dependent variable: Secondary Exit Indicator								
	(1)		(2)		(3)		(4)	
Sell Pressure	0.133	***					0.097	
	[0.026]						(1.26)	
	(3.99)							
High Sell Pressure			0.190	***				
			[0.037]					
			(2.74)					
Sell Pressure = 1					0.168			
					[0.032]			
					(1.44)			
Sell Pressure = 2					0.313	**		
					[0.06]			
					(2.48)			
Sell Pressure >= 3					0.395	***		
					[0.076]			
					(3.88)			
Imputed TEV	0.016		0.017		0.015		-0.012	
	(0.55)		(0.58)		(0.50)		(-0.27)	
Mgmt. Participation	0.034		0.038		0.033		-0.041	
	(0.47)		(0.51)		(0.45)		(-0.46)	
U.S. Target	-0.417	***	-0.416	***	-0.416	***	-0.542	***
	(-4.38)		(-4.40)		(-4.35)		(-2.71)	
Exit Novice	-0.074		-0.078		-0.072		-0.317	**
	(-1.08)		(-1.14)		(-1.03)		(-1.98)	
Affiliated	0.129		0.074		0.144		0.141	
	(1.22)		(0.72)		(1.09)		(0.40)	
Past LBO activity	0.344		0.34		0.35		0.498	*
	(1.20)		(1.19)		(1.22)		(1.62)	
Exit HY Spread	-0.09	***	-0.089	***	-0.091	***	-0.086	***
	(-4.98)		(-4.95)		(-5.09)		(-4.21)	
Exit Cold IPO Market	0.08		0.081		0.082		0.033	
	(0.73)		(0.74)		(0.76)		(0.33)	
Stage	-0.035		-0.031		-0.035		-0.021	
	(-0.92)		(-0.80)		(-0.92)		(-0.61)	
Add-On	0.124		0.122		0.124		0.278	**
	(1.39)		(1.35)		(1.39)		(2.17)	
Secondary	0.318	***	0.321	***	0.318	***	0.283	**
	(2.78)		(2.77)		(2.81)		(2.27)	
Divisional	-0.228	***	-0.225	***	-0.229	***	-0.077	
	(-3.44)		(-3.42)		(-3.39)		(-0.72)	
Public to private	-0.374	*	-0.37	*	-0.373	*	-0.1	
	(-1.78)		(-1.77)		(-1.78)		(-0.50)	
Financial seller	-0.118		-0.113		-0.116		-0.149	
	(-0.85)		(-0.81)		(-0.83)		(-0.74)	
Intercept	-2.281	***	-2.182	**	-2.327	***	0.044	
	(-2.65)		(-2.53)		(-2.65)		(0.30)	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.06		0.06		0.06		0.05	
N	4,139		4,139		4,139		3,525	

Table 6
Likelihood of Secondary Exits (cont.)

Panel B. Sell Pressure Index Components								
Dependent variable: Secondary Exit Indicator								
	(1)		(2)		(3)		(4)	
Late Seller	0.283	***						
	[0.055]							
	(2.60)							
Last Exit			0.154	*				
			[0.03]					
			(1.75)					
Lack of Reputation					0.188	*		
					[0.036]			
					(1.87)			
Infrequent Fund Raiser							0.022	
							[0.004]	
							(0.24)	
Imputed TEV	0.018		0.016		0.011		0.015	
	(0.61)		(0.55)		(0.36)		(0.51)	
Mgmt. Participation	0.044		0.037		0.031		0.036	
	(0.59)		(0.49)		(0.42)		(0.48)	
U.S. Target	-0.395	***	-0.406	***	-0.408	***	-0.397	
	(-4.22)		(-4.25)		(-4.44)		(-4.31)	***
Exit Novice	-0.064		-0.087		-0.054		-0.076	
	(-0.93)		(-1.25)		(-0.75)		(-1.07)	
Affiliated	0.046		0.053		0.153		0.046	
	(0.45)		(0.52)		(1.19)		(0.47)	
Past LBO activity	0.32		0.32		0.359		0.329	
	(1.12)		(1.12)		(1.25)		(1.14)	
Exit HY Spread	-0.089	***	-0.091	***	-0.092	***	-0.091	
	(-4.97)		(-4.91)		(-5.02)		(-4.95)	***
Exit Cold IPO Market	0.079		0.082		0.088		0.087	
	(0.71)		(0.77)		(0.80)		(0.80)	
Stage	-0.032		-0.015		-0.014		-0.016	
	(-0.87)		(-0.40)		(-0.37)		(-0.42)	
Add-On	0.117		0.132		0.123		0.127	
	(1.32)		(1.45)		(1.38)		(1.39)	
Secondary	0.323	***	0.326	***	0.32	***	0.323	
	(2.79)		(2.83)		(2.82)		(2.79)	***
Divisional	-0.226	***	-0.224	***	-0.232	***	-0.228	
	(-3.44)		(-3.40)		(-3.48)		(-3.48)	***
Public to private	-0.379	*	-0.373	*	-0.371	*	-0.376	
	(-1.87)		(-1.77)		(-1.77)		(-1.81)	*
Financial seller	-0.111		-0.112		-0.115		-0.112	
	(-0.82)		(-0.82)		(-0.85)		(-0.82)	
Intercept	-2.165	**	-2.113	**	-2.347	***	-2.128	
	(-2.50)		(-2.43)		(-2.69)		(-2.45)	**
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.06		0.06		0.06		0.06	
N	4,139		4,139		4,139		4,139	

Table 7
Holding Period of Secondary Exits

This table presents results of a competing risks regression model, in which the dependent variable is the holding period of an LBO, measured in years. The sample includes both deals with known exit and deals that were not exited at the end of the sample period. The main explanatory variable are: Sell Pressure, the sum of variables Exit Pressure, Late Seller, Lack of Reputation, and Infrequent Fund Raiser at any given year during the holding period of a deal; Sell Pressure at Entry, the value of the Sell Pressure index prevailing for the buyer at the date of purchase of the LBO; Increase in Sell Pressure, an indicator variable equal to 1 if the Sell Pressure index increases during the holding period (relative to "Sell Pressure at Entry"); Buy Pressure at Entry, the value of the Buy Pressure index prevailing for the buyer at the date of purchase of the LBO. All other variables are defined in the caption of Table 1 and in Appendix B. Standard errors are clustered by buyer. *t*-statistics are reported in parentheses. The symbols ***, **, * denote significance at 1%, 5% and 10%.

Dependent variable: Holding period								
	(1)		(2)		(3)		(4)	
Sell Pressure	1.217	***						
	(4.50)							
High Sell Pressure			1.306	***				
			(3.80)					
Increase in Sell Pressure					1.365	***	1.333	***
					(3.78)		(3.51)	
Sell Pressure at entry					1.141	***		
					(2.93)			
Buy Pressure at entry							1.072	*
							(1.75)	
Imputed TEV	1.122	***	1.127	***	1.122	***	1.120	***
	(4.15)		(4.29)		(4.15)		(4.11)	
Mgmt. Participation	1.125	*	1.125	**	1.126	**	1.129	**
	(1.96)		(1.98)		(1.97)		(2.01)	
U.S. Target	0.862	**	0.865	**	0.868	*	0.875	*
	(2.02)		(1.99)		(1.94)		(1.82)	
Exit Novice	1.034		1.040		1.016		1.034	
	(0.47)		(0.55)		(0.23)		(0.48)	
Affiliated	1.118		1.041		1.070		1.030	
	(1.16)		(0.44)		(0.71)		(0.31)	
Past LBO activity	1.590	***	1.568	***	1.585	***	1.585	***
	(9.41)		(9.32)		(9.45)		(9.44)	
Exit HY Spread	0.920	***	0.920	***	0.920	***	0.920	***
	(8.15)		(8.16)		(8.15)		(8.20)	
Exit Cold IPO Market	0.646	***	0.650	***	0.646	***	0.646	***
	(6.27)		(6.23)		(6.27)		(6.28)	
Stage	0.955	**	0.960	**	0.958	**	0.950	**
	(2.22)		(1.98)		(2.08)		(2.29)	
Add-On	1.024		1.029		1.024		1.020	
	(0.26)		(0.32)		(0.26)		(0.23)	
Secondary	1.264	**	1.267	**	1.263	***	1.263	***
	(2.48)		(2.49)		(2.47)		(2.48)	
Divisional	0.938		0.940		0.937		0.935	
	(0.76)		(0.73)		(0.77)		(0.80)	
Public to private	0.675	**	0.674	**	0.672	**	0.670	**
	(2.47)		(2.47)		(2.50)		(2.52)	
Financial seller	1.002		0.994		0.999		0.997	
	(0.02)		(0.04)		(0.00)		(0.02)	
Vintage dummies	Yes		Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes		Yes	
P-value Wald test	0.00		0.00		0.00		0.00	
N	42,893		42,893		42,893		42,893	

Table 8
Valuation of Secondary Exits

This table presents regression results of the relation between LBO exit valuation multiples and Sell Pressure. Panel A shows results for Excess Sales Multiples and Excess Ebitda Multiple using the Sell Pressure index and its variants. Panel B uses the individual components of the Sell Pressure index. All variables are defined in Table 1 and Appendix B. Standard errors are clustered by deal year. *t*-statistics are reported in parentheses. Symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A. Sell Pressure Index								
A.1. Dependent variable: Exit Excess Sales Multiple								
	(1)		(2)		(3)		(4)	
Sell Pressure	0.01						-0.016	
	(0.25)						(-0.13)	
Sec. Exit*Sell Pressure	-0.324	***					-0.412	**
	(-4.22)						(-2.41)	
High Sell Pressure			0.015					
			(0.15)					
Sec. Exit*High Sell Pressure			-0.466	***				
			(-3.10)					
Sell Pressure = 1					0.028			
					(0.25)			
Sell Pressure = 2					0.022			
					(0.18)			
Sell Pressure >= 3					0.104			
					(0.66)			
Sec. Exit*Sell Pressure = 1					-0.322			
					(-1.31)			
Sec. Exit*Sell Pressure = 2					-0.613	**		
					(-2.63)			
Sec. Exit*Sell Pressure >= 3					-1.08	***		
					(-4.37)			
Secondary	0.462	***	0.223	**	0.457	**	0.508	**
	(3.47)		(2.16)		(2.12)		(2.05)	
Buyer Size	0.048	***	0.048	***	0.048	***	0.056	
	(3.02)		(2.92)		(2.82)		(1.11)	
Mgmt. Participation	-0.084		-0.086		-0.084		-0.063	
	(-1.16)		(-1.15)		(-1.16)		(-0.54)	
U.S. Target	0.083		0.088		0.081		-0.068	
	(0.75)		(0.80)		(0.73)		(-0.29)	
Affiliated	-0.072		-0.072		-0.07		-0.117	
	(-0.95)		(-0.96)		(-0.93)		(-0.54)	
Past LBO Activity	-0.18		-0.148		-0.171		-0.32	
	(-1.46)		(-1.28)		(-1.36)		(-0.73)	
Novice	0.439		0.438		0.439		0.205	
	(1.47)		(1.48)		(1.49)		(0.41)	
HY Spread	-0.056	**	-0.055	**	-0.056	**	-0.049	
	(-2.30)		(-2.23)		(-2.27)		(-1.61)	
Cold IPO Market	-0.103		-0.103		-0.102		-0.004	
	(-0.85)		(-0.85)		(-0.84)		(-0.03)	
Stage	0.038	*	0.035		0.037		0.041	
	(1.73)		(1.53)		(1.64)		(0.90)	
Add-On	0.141		0.14		0.14		0.238	
	(1.16)		(1.16)		(1.14)		(1.64)	
Entry Type dummies	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.06		0.06		0.05		0.06	
N	1090		1090		1090		827	

Table 8
Valuation of Secondary Exits (cont.)

Panel A. Sell Pressure Index								
A.2.Dependent variable: Exit Excess Ebitda Multiple								
	(1)		(2)		(3)		(4)	
Sell Pressure	0.889	**					0.876	
	(2.73)						(1.27)	
Sec. Exit*Sell Pressure	-2.396	**					-2.273	*
	(-2.60)						(-1.80)	
High Sell Pressure			1.275	**				
			(2.58)					
Sec. Exit*High Sell Pressure			-2.4	*				
			(-1.89)					
Sell Pressure = 1					1.199			
					(1.48)			
Sell Pressure = 2					2.124	**		
					(2.20)			
Sell Pressure >= 3					2.872	*		
					(1.89)			
Sec. Exit*Sell Pressure = 1					-3.427	*		
					(-1.73)			
Sec. Exit*Sell Pressure = 2					-3.608	**		
					(-2.10)			
Sec. Exit*Sell Pressure >= 3					-10.526	**		
					(-2.35)			
Secondary	1.811		-0.393		2.166		1.166	
	(0.94)		(-0.31)		(1.08)		(0.60)	
Buyer Size	-0.076		-0.069		-0.091		-0.068	
	(-0.67)		(-0.60)		(-0.78)		(-0.24)	
Mgmt. Participation	0.151		0.179		0.16		0.449	
	(0.28)		(0.32)		(0.30)		(0.62)	
U.S. Target	1.633	***	1.557	***	1.66	***	1.105	
	-3.53		-3.38		-3.13		-0.72	
Affiliated	-1.28	*	-1.334	**	-1.327	*	-0.818	
	(-1.97)		(-2.12)		(-2.05)		(-0.64)	
	-0.288		-0.427		-0.104		2.178	
	(-0.40)		(-0.63)		(-0.14)		-0.73	
Novice	3.734	**	3.76	**	3.706	*	6.283	**
	(2.09)		(2.15)		(2.01)		(2.07)	
HY Spread	-0.26	**	-0.233	**	-0.259	**	-0.293	
	(-2.64)		(-2.19)		(-2.56)		(-1.24)	
Cold IPO Market	-1.134	*	-1.208	*	-1.123	*	-0.151	
	(-1.93)		(-2.04)		(-1.90)		(-0.17)	
Stage	-0.098		-0.091		-0.096		-0.181	
	(-0.58)		(-0.59)		(-0.60)		(-0.62)	
Add-On	0.395		0.386		0.414		0.195	
	(0.44)		(0.44)		(0.45)		(0.22)	
Entry Type dummies	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.05		0.04		0.05		0.06	
N	582		582		582		554	

Table 8
Valuation of Secondary Exits (cont.)

Panel B. Sell Pressure Index Components				
B.1. Dependent variable: Exit Excess Sales Multiple				
	(1)	(2)	(3)	(4)
Late seller	-0.269 **			
	(-2.50)			
Sec. Exit*Late Seller	-0.328 **			
	(-2.17)			
Lack of Reputation		0.184 **		
		(2.29)		
Sec. Exit*Lack of Reputation		-0.379 *		
		(-1.84)		
Infrequent Fund Raiser			0.089	
			(0.93)	
Sec. Exit*Irreg. Fund Raiser			-0.432 *	
			(-2.00)	
High Sell Pressure				0.015
				(0.15)
Sec. Exit*High Sell Pressure				-0.466 ***
				(-3.10)
Secondary	0.137	0.255	0.163	0.223 **
	-1.33	(1.57)	(1.46)	(2.16)
All other controls	Yes	Yes	Yes	Yes
Industry & year dummies	Yes	Yes	Yes	Yes
PE firm fixed effects	No	No	No	No
R-squared	0.06	0.05	0.05	0.06
N	1090	1090	1090	1090
B.2. Dependent variable: Exit Excess Ebitda Multiple				
	(1)	(2)	(3)	(4)
Late seller	0.503			
	(0.71)			
Sec. Exit*Late Seller	-3.724 *			
	(-1.88)			
Last Exit		1.739 *		
		(1.82)		
Sec. Exit*Last Exit		-2.654 *		
		(-1.91)		
Lack of Reputation			1.207 *	
			(1.76)	
Sec. Exit*Lack of Reputation			-3.016 ***	
			(-2.90)	
Infrequent Fund Raiser				0.685
				(1.14)
Sec. Exit*Irreg. Fund Raiser				-2.121
				(-1.01)
Secondary	-0.359	-0.973	0.26	-0.844
	(-0.32)	(-0.96)	(0.21)	(-0.73)
All other controls	Yes	Yes	Yes	Yes
Industry & year dummies	Yes	Yes	Yes	Yes
PE firm fixed effects	No	No	No	No
R-squared	0.04	0.04	0.04	0.04
N	582	582	582	582

Table 9
Valuation of Secondary Deals: Buyer and Seller Pressure

This table presents regression results of the relation between the Excess Sales Multiple (Panel A) and Excess Ebitda Multiple (Panel B) for both Buy and Sell Pressure. Buy (Sell) High Pressure is an Indicator variable equal to 1 if Buy (Sell) Pressure is equal or greater than 2. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A. Dependent variable: Excess Sales Multiple								
	(1)		(2)		(3)		(4)	
Buy Pressure	0.193	***						
	(3.79)							
Sell Pressure	-0.084	*						
	(-1.71)							
Buy Pressure x High Sell Pressure			0.112					
			(1.31)					
Buy Pressure x Low Sell Pressure			0.219	***				
			(4.30)					
Sell Pressure x High Buy Pressure					-0.006			
					(-0.05)			
Sell Pressure x Low Buy Pressure					-0.145	***		
					(-3.75)			
High Buy Pressure x High Sell Pressure							0.165	
							(0.62)	
High Buy Pressure x Low Sell Pressure							0.385	**
							(2.15)	
Low Buy Pressure x High Sell Pressure							-0.243	**
							(-2.07)	
Buyer Size	0.084	*	0.08	*	0.076	*	0.076	*
	(1.75)		(1.76)		(1.70)		(1.69)	
Mgmt. Participation	-0.042		-0.055		-0.033		-0.042	
	(-0.47)		(-0.64)		(-0.37)		(-0.53)	
U.S. Target	-0.136		-0.145		-0.043		-0.089	
	(-0.69)		(-0.76)		(-0.21)		(-0.48)	
Past LBO Activity	0.900	*	0.929	*	0.98	*	0.905	*
	(1.85)		(1.86)		(2.01)		(1.91)	
HY Spread	-0.115		-0.117		-0.1		-0.125	
	(-1.57)		(-1.54)		(-1.42)		(-1.53)	
Cold IPO Market	0.504	***	0.51	***	0.473	***	0.472	***
	(3.96)		(4.08)		(3.28)		(3.42)	
Intercept	-3.032		-3.246		-3.242		-2.857	
	(-1.25)		(-1.29)		(-1.33)		(-1.21)	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.10		0.10		0.08		0.10	
N	294		294		294		294	

Table 9
Valuation of Secondary Deals: Buyer and Seller Pressure (cont.)

Panel B. Dependent variable: Excess Ebitda Multiple				
	(1)	(2)	(3)	(4)
Buy Pressure	1.417 **			
	(2.48)			
Sell Pressure	-0.567			
	(-0.43)			
Buy Pressure x High Sell Pressure		1.243		
		(1.05)		
Buy Pressure x Low Sell Pressure		1.551 ***		
		(3.33)		
Sell Pressure x High Buy Pressure			-0.396	
			(-0.27)	
Sell Pressure x Low Buy Pressure			-1.367	
			(-0.94)	
High Buy Pressure x High Sell Pressure				0.599
				(0.20)
High Buy Pressure x Low Sell Pressure				1.61
				(1.42)
Low Buy Pressure x High Sell Pressure				-1.70
				(-0.44)
Buyer Size	-0.502	-0.49	-0.583	-0.547
	(-1.28)	(-1.25)	(-1.46)	(-1.30)
Mgmt. Participation	-0.558	-0.498	-0.424	-0.417
	(-0.36)	(-0.34)	(-0.26)	(-0.29)
U.S. Target	-1.933	-2.014	-1.898	-2.014
	(-1.00)	(-1.16)	(-0.97)	(-1.00)
Past LBO Activity	-2.482	-2.688	-2.10	-2.11
	(-0.39)	(-0.41)	(-0.37)	(-0.33)
HY Spread	0.436	0.578	0.072	0.254
	(0.51)	(0.83)	(0.08)	(0.29)
Cold IPO Market	-1.904	-1.869	-1.60	-1.676
	(-0.62)	(-0.60)	(-0.52)	(-0.54)
Intercept	20.466	20.947	21.92	21.148
	(0.53)	(0.53)	(0.63)	(0.56)
Industry & year dummies	Yes	Yes	Yes	Yes
R-squared	0.25	0.25	0.22	0.22
N	120	120	120	120

Table 10
Pressure and Leverage of Secondary Deals

This table presents regression results of the relation between leverage and Buy Pressure, using three measures of the former: the ratio of Senior Debt to (*i*) Enterprise Value, (*ii*) Ebitda, and (*iii*) Assets. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Leverage					
	Debt / Ent. Value		Debt / EBITDA		Debt / Assets	
	(1)		(2)		(3)	
Buy Pressure	0.007		0.092		0.012	
	(0.77)		(0.42)		(0.11)	
Secondary*Buy Pressure	-0.031	**	-0.553	*	-0.259	**
	(-2.25)		(-1.69)		(-2.12)	
Secondary	0.056	**	0.854		0.737	***
	(2.03)		(1.22)		(4.00)	
Buyer Size	0.000		-0.246		-0.019	
	(0.11)		(-1.40)		(-0.55)	
Mgmt. Participation	-0.020		-0.620		0.008	
	(-0.86)		(-1.53)		(0.04)	
U.S. Target	0.005		-0.368		-0.468	
	(0.28)		(-0.84)		(-1.41)	
Novice	0.006		-0.002		0.288	*
	(0.61)		(-0.00)		(1.82)	
Affiliated	-0.011		0.072		0.419	
	(-0.44)		(0.22)		(1.34)	
Past LBO activity	0.010		3.622	**	-0.257	
	(0.24)		(2.58)		(-0.42)	
HY Spread	-0.012	***	-0.307	**	-0.069	
	(-3.63)		(-2.42)		(-0.75)	
Cold IPO Market	0.015		0.400		0.314	**
	(0.87)		(0.87)		(1.99)	
Intercept	0.719	***	-13.319	*	3.058	
	(7.88)		(-1.65)		(0.88)	
Industry & year dummies	Yes		Yes		Yes	
R-squared	0.09		0.03		0.05	
N	554		186		176	

Table 11
Pressure and Syndication in Secondary Deals

This table presents regression results of the relation between deal syndication and Buy Pressure, using three measures of the former: (*i*) an indicator variable if the deal is syndicated (involves more than one buyer); (*ii*) the number of buyers involved in the deal; (*iii*) the deal imputed equity value divided by the number of buyers. All variables are defined in the caption of Table 1 and in Appendix B. Standard errors clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Syndication measures					
	Number of participants		Deal Value per participant		Deal is Syndicated	
	(1)		(2)		(3)	
Buy Pressure	0.005		-0.009		0.067	**
	(1.11)		(-1.50)		(2.27)	
Secondary	0.014		-0.006		0.017	
	(0.81)		(-0.24)		(0.21)	
Secondary*Buy Pressure	-0.022	**	0.032	**	-0.085	
	(-2.30)		(2.31)		(-1.49)	
Imputed TEV	0.048	***	0.894	***	0.261	***
	(12.84)		(147.18)		(11.46)	
Mgmt. Participation	0.065	***	-0.103	***	0.343	***
	(10.73)		(-11.71)		(7.40)	
U.S. Target	0.026		-0.045	*	0.270	**
	(1.45)		(-1.66)		(2.34)	
Novice	-0.030	***	0.029	**	-0.043	
	(-3.20)		(2.02)		(-0.66)	
Affiliated	0.087	***	-0.122	***	0.311	***
	(9.30)		(-8.39)		(3.24)	
Past LBO activity	-0.061		0.085		-0.279	
	(-1.58)		(1.43)		(-1.05)	
HY Spread	0.001		-0.002		-0.003	
	(0.32)		(-0.51)		(-0.21)	
Cold IPO Market	-0.008		0.012		-0.099	
	(-0.53)		(0.54)		(-1.08)	
Intercept	0.711	***	0.214		-1.745	**
	(7.41)		(1.46)		(-2.40)	
Industry & year dummies	Yes		Yes		Yes	
R-squared	0.07		0.86		0.04	
N	9,575		9,575		9,575	

Table 12
Pressure and Fund Performance

This table presents regression results of the relation between fund performance and Buy Pressure, using four measures of fund performance: (*i*) the fund's Internal Rate of Return reported in Preqin as of December 31 2010; (*ii*) the rank in terms of IRR of a PE fund, computed across funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.) (a rank of 1 indicates the fund with the lowest rank; (*iii*) the money-on-money fund multiple; (*iv*) the rank of Multiple of a PE fund, computed across funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.) (1 indicates the fund with the lowest rank). Standard errors clustered by buyer fund family. All variables are defined in Appendix B. *t*-statistics are reported in parentheses. Symbols ***, **, * denote significance at 1%, 5% and 10%.

Dependent variable: Fund performance								
	IRR		IRR rank		Multiple		Multiple rank	
	(1)		(2)		(3)		(4)	
Average Buy Pressure	-2.755	*	-1.268		-0.077	*	-2.751	**
	(-1.92)		(-0.91)		(-1.74)		(-2.20)	
Fund size	0.000		0.000		0.000		0.000	
	(-0.71)		(-0.94)		(-0.56)		(-0.40)	
Fund sequence	-0.341		-0.067		-0.007		-0.447	
	(-0.50)		(-0.10)		(-0.30)		(-0.66)	
Affiliated	-0.733		-1.223		0.008		-3.106	
	(-0.07)		(-0.23)		(0.03)		(-0.68)	
Novice	-0.045		-2.226		-0.050		-3.804	
	(-0.02)		(-0.89)		(-0.53)		(-1.49)	
Focus (BO = 1)	1.040		1.834		-0.007		3.621	
	(0.50)		(0.79)		(-0.08)		(1.58)	
Intercept	73.705	***	10.489	**	2.860	***	13.572	***
	(20.17)		(2.19)		(23.04)		(3.73)	
Year dummies	Yes		Yes		Yes		Yes	
R-squared	0.34		0.23		0.52		0.24	
N	252		252		286		286	

Appendix A

This appendix describes in detail the construction of the LBO sample. We extract from S&P's Capital IQ all closed merger transactions featuring the keywords "Going Private Transaction", "Leveraged Buy Out (LBO)", "Management Buyout" and "Secondary LBO" transactions with targets located in the U.S. and in 12 European countries (Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Spain, Sweden, Switzerland, and United Kingdom) for the period from January 1st, 1980 to December 31st, 2010. We exclude targets in financial industries, acquisitions of remaining interest, acquisitions of minority stakes, targets with reported negative sales or negative enterprise value, Venture Capital deals misidentified as LBOs in Capital IQ; corporate acquisitions in which the acquirer is not associated with a PE owner; acquisitions by non-PE investors, such as hedge funds, groups of individual investors, corporate venture funds, and non-PE arms of financial institutions. This initial sample includes 23,032 deals. After conducting extensive individual checks using the textual deal commentary, we further exclude: deals without information on the identity of buyers and sellers, acquisitions by management teams (e.g. management buy-outs) with no evidence of involvement by a PE sponsor; and deals in which the target firm is bankrupt or in financial distress. When an acquisition involves multiple stages or transactions, we keep the one in which the buyer acquired most of its stake (typically the first transaction).

Although Capital IQ contains the unique identifier(s) of the PE buyer(s), this information is sometimes available at the fund level (e.g. "KKR EUROPEAN BUYOUT FUND II, L.P.") and sometimes at the fund family level (e.g. "KOHLBERG KRAVIS ROBERTS & CO."). Moreover, we found cases in Capital IQ of families that are considered distinct but actually belong to the same PE group (e.g. "BARCLAYS PRIVATE EQUITY LTD." and "BARCLAYS PRIVATE EQUITY FRANCE SAS"). We therefore create a unique PE fund family identifier to address such cases.

For each deal we identify a "leading buyer": In single-buyer deals the leading buyer is the family of the acquiring fund; in syndicated deals the leading buyer is the PE fund family with highest reputation among all buyers, where reputation is measured as the dollar market share of the PE fund family across all LBOs conducted up to that year. For each deal and each leading buyer, we require that the acquisition date is within the investment period range (years 1 through 6) of at least one of the funds in the PE fund family. The final sample contains 9,575 LBO deals, out of which we able to trace 4,319 exit routes and dates.

Appendix B

Deal Variables	
Variable:	**Definition:**
Secondary	Indicator variable equal to 1 if the seller is a PE fund, and zero otherwise.
Imputed TEV	Implied Total Enterprise Value (TEV) is the sum of the target's equity market value valued at the LBO offer price plus net debt (financial debt minus cash and marketable securities). For transactions without deal value information, we compute an estimate of deal value using the methodology of Stromberg (2008): see Table A-1 for details of this procedure. TEV is measured in real December 2010 U.S. dollars, after conversion at historical exchange rates.
Mgmt. Participation	Indicator variable equal to 1 if at least one member of the management team of the target is referenced as an investor in the LBO transaction, and zero otherwise.
U.S. Target	Indicator variable equal to 1 if the target is headquartered in the U.S., and zero otherwise.
Past LBO Activity	Log of moving average of the previous 6 quarters' LBO activity relative to deal date, adjusted for geography (U.S. vs. non-U.S.), and measured in billions of real 2010 U.S. dollars.
HY Spread	Difference, at the time of the LBO, between the Barclays High Yield Composite index and the Barclays average corporate AAA corporate bond rate. The index is only available after 1987.
Cold IPO Market	Indicator equal to 1 if the IPO market is 'cold' at the time of the LBO, and zero otherwise. To define a cold [hot] IPO market, we sum the deal value of IPOs taking place in the same geography (U.S. or Europe), same Fama-French 12-code industry, and year as the LBO, and check if this value is lower [higher] than the geography- and industry-level time series mean. IPO values are measured in real 2010 U.S. dollars, after conversion at historical exchange rates.
Stage	Number of years elapsed, relative to the deal date, since fund raising for the youngest fund in the PE fund family whose investment period overlaps with the LBO deal date (that is. whose deal date falls within years 1 through 6 of the lifetime of the fund).
Divisional	Indicator variable equal to 1 if the seller is a corporate entity, and zero otherwise.
Financial seller	Indicator variable equal to 1 if the seller is a financial institution, and zero otherwise.
Public to private	Indicator variable equal to 1 if the target firm is a publicly listed company, and zero otherwise.
Private to private	Indicator equal to 1 if the seller is a non-PE investor group or individual, zero otherwise.
Sales Multiple	Ratio between TEV and latest available yearly sales for the target firm at the time of the LBO. This variable only takes non-missing values when deal value is known.
Excess Sales Multiple	Difference between the target's Sales Multiple and a valuation benchmark constructed as a follows. For every year, geography (U.S. versus Europe), industry (Fama-French 12-industry classification) and public status (public or private), we compute the median sales multiple for all merger transactions with value larger than 1 million dollars (at constant 2010 dollars) involving a majority stake over the previous two years relative to the date of the LBO.
Ebitda Multiple	Ratio between TEV and Ebitda for the target firm at the time of the LBO. This variable only takes non-missing values when deal value is known.
Excess Ebitda Multiple	Difference between the target's Ebitda Multiple and the benchmark, the median Ebitda multiple for all merger transactions with value larger than 1 million dollars (at constant 2010 dollars) involving a majority stake over the previous two years in the same geography (U.S. versus Europe), industry (Fama-French 12-industry classification) and public status (public or private).
Industry Specialization	Dummy variable that takes the value 1 if the PE fund family has done more than one-third of its

	past deals in the same industry group as the target's industry.
Industry Specializ. (%)	Percentage of the PE fund family's past deals in the same industry group as the target's industry.
Size Specialization	Set of three indicator variables equal to 1 if the PE fund family has done more than two-thirds of its deals in the small (medium) [large] size category, defined as deals with an imputed enterprise value < 50 million (between 50 and 250 million) [> 250 million] real 2010 U.S. dollars.
Industry Concentration	Herfindahl index, by geography (U.S. vs. Europe) and year, of public firms with the 48 Fama-French industry code as the target firm.
Asset Liquidity	Target industry's ratio of the value of corporate transactions (excluding LBOs) to the value of the total assets of public firms in that industry (Schlingemann, Stulz and Walkling, 2002).
Debt to Enterprise Value	Ratio of Senior Debt to Total Enterprise Value. This ratio is only computed for deals in which total enterprise value is observed. Senior Debt, defined as the sum of all term debt facilities used in the deal, is obtained from multiple sources including Capital IQ, DealScan, Dealogic, and company filings in the case of public-to-private deals.
Debt to Ebitda	Ratio of Senior Debt to Ebitda for the target firm at the time of the LBO. Senior Debt is defined as above (see "Debt to Enterprise Value").
Debt to Assets	Ratio of Senior Debt to Total Assets for the target firm at the time of the LBO. Senior Debt is defined as above (see "Debt to Enterprise Value").
Syndicated	Indicator variable equal to 1 if there is more than one buyer, and zero otherwise. Fund belonging to the same fund family are counted as a single buyer.
Buyer Variables	
Variable:	**Definition:**
Buy Pressure	Sum of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser.
High Buy Pressure	Indicator variable equal to 1 if Buy Pressure is equal or greater than 2.
Dry Powder	Indicator variable equal to 1 if the buyer is above median in terms of fund raising and below median in terms of deal activity. These criteria are computed as follows. First, for each PE fund family and year, we calculate the aggregate funds raised in the past 3 years, and the corresponding median across fund families in that year. Second, for each PE fund family and year, we compute the aggregate dollar value of all investment made during the past three years, and its respective median across fund families in that year. All monetary values are measured in real December 2010 U.S. dollars, after conversion at historical exchange rates.
Late Buyer	Indicator variable equal to 1 if the buyer's most recent fund at the time of the deal is at the end of its investment period (4 to 6 years after inception), and zero otherwise.
Lack of Reputation	Indicator variable equal to 1 if the buyer is below the 75th percentile in terms of rank of value-weighted market share, computed using all deals made from 1980 up to deal year.
Infrequent Fund Raiser	Indicator variable equal to 1 if the buyer's average time between fund raisings is more than 3 years. Time between raisings is computed dividing the total number of funds raised by a firm up to the observation year by the age of the firm (time since the firm's first deal in the database).
Affiliated	Indicator variable equal to 1 if the buyer is affiliated to a financial institution or government agency, and zero otherwise.
Novice	Indicator variable equal to 1 if the buyer is a PE fund family with 3 funds or less under management at the time of the LBO deal, and zero otherwise.
Buyer Size	Log of the value of deals done by the buyer in the last five years.
Exit variables	
Variable:	**Definition:**

Secondary Exit	Exit route of the LBO is a sale to another PE fund or group of PE funds.
Down Exit	Exit route of the LBO is a sale to management, a distressed merger transaction, or bankruptcy.
Trade Sale Exit	Exit route of the LBO is a sale to a corporate buyer.
IPO Exit	Exit route of the LBO is an equity listing on public markets.
Sell Pressure	Sum of variables Exit Pressure, Late Seller, Lack of Reputation, and Infrequent Fund Raiser.
High Sell Pressure	Indicator variable equal to 1 if Sell Pressure is equal or greater than 2.
Late Exit	Indicator variable equal to 1 if the three or more years have elapsed since the PE fund family last exited an LBO deal.
Late Seller	Indicator variable equal to 1 if the sale takes place in years 9 or 10 of the PE fund family's oldest active fund (i.e. less than 11 years old), and zero otherwise.
Lack of Reputation (at exit)	Indicator variable equal to 1 if the buyer is below the 75th percentile in terms of rank of value-weighted market share, computed using all deals made from 1980 up to the exit year.
Infrequent Fund Raiser (at exit)	Indicator variable equal to 1 if the buyer's average time between fund raisings is more than 3 years. Time between raisings is computed dividing the total number of funds raised by a firm up to the observation year by the age of the firm (time since the firm's first deal in the database).
Exit HY Spread	Difference, at the time of the exit from LBO, between the Barclays High Yield Composite index and the Barclays average corporate AAA corporate bond rate. Only available after 1987.
Exit Cold IPO Market	Indicator equal to 1 if the IPO market is 'cold' at the time of the LBO exit, and zero otherwise.
Add-Ons	Indicator variable equal to 1 if there were significant acquisitions during the time that the buyer held the target firm in its portfolio, and zero otherwise. We define acquisitions as significant if there are three or more acquisitions made by the target company during this period or if they represent a cumulative dollar value of 5% or more of the original LBO deal value.
Novice at Exit	Indicator variable equal to 1 if, at the time of exit from the LBO deal, the buyer is a PE fund family with 3 funds or less under management, and zero otherwise.
Exit Sales Multiple	Ratio between TEV and latest available yearly sales for the target firm at the time of the exit from the LBO. This variable only takes non-missing values when exit value is known.
Exit Excess Sales Multiple	Difference between the target's Sales Multiple and the valuation benchmark at the time of exit from the LBO (see "Excess Sales Multiple").
Exit Ebitda Multiple	Ratio between TEV and Ebitda for the target firm at the time of exit from the LBO. This variable only takes non-missing values when exit value is known.
Exit Excess Ebitda Multiple	Difference between the target's Ebitda Multiple and the valuation benchmark at the time of exit from the LBO (see "Excess Ebitda Multiple").
Holding Period variables	
Variable:	**Definition:**
Holding Period	Difference, in years, between the announcement date of the exit and the announcement date of the entry (effective dates are used whenever available).
Sell Pressure (time-varying)	Sum of variables Exit Pressure, Late Seller, Lack of Reputation, and Infrequent Fund Raiser at any given year during the holding period of a deal.
Sell Pressure at Entry	Sum of the values of variables Exit Pressure, Late Seller, Lack of Reputation, and Infrequent Fund Raiser prevailing for the buyer at the date of purchase of the LBO.
Increase in Sell Pressure	Indicator variable equal to 1 if the Sell Pressure index increases during the holding period (relative to "Sell Pressure at Entry"), and zero otherwise.
Buy Pressure at Entry	Sum of the values of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser prevailing for the buyer at the date of purchase of the LBO.

Fund Performance variables	
Variable:	**Definition:**
IRR	Internal rate of return of a PE fund, as of December 31 2010, reported by Preqin. Funds are identified as buyers using the following procedure: a PE fund is considered a buyer if Capital IQ indicates it as such, or if the fund is the youngest fund in the PE fund family whose investment period overlaps with the LBO deal date (that is, whose deal date falls within years 1 through 6 of the lifetime of the fund). Only funds marked as "closed" or "liquidated" in Preqin are used.
IRR rank	Rank in terms of IRR of a PE fund, computed across funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.). A rank of 1 indicates the fund with the lowest rank.
Multiple	Money-on-money fund multiple, as of December 31 2010, reported by Preqin. See also "IRR".
Multiple rank	Rank of Multiple of a PE fund, computed across funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.). A rank of 1 indicates the fund with the lowest rank.

Table A-1

This table shows the results of a Heckman selection model used to create the imputed Enterprise Values for transactions without deal value information, following Stromberg (2008).Variables specifically constructed for this regression include: Distress, an indicator variable equal to 1 if the LBO target deal is financially distressed; Financial sponsor, an indicator variable equal to 1 if there is at least one Financial Sponsor among buyers; Public Investment Fund, an indicator variable equal to 1 if at least one of the buyers is a listed fund; Independent Private Fund, an indicator variable equal to 1 if at least one of the buyers is an private fund not affiliated with a financial institution; MBO, an indicator variable equal to 1 if there is no evidence of PE involvement; Sponsor>20 deals, an indicator variable equal to 1 if the buyer is present in more than 20 deals within the sample period; dummies for geography, where Continental Europe is an indicator variable that takes the value 1 for targets in Belgium, France, Germany, Italy, Luxembourg, Netherlands, Spain, and Switzerland, and Scandinavia is an indicator variable that takes the value 1 for targets in Denmark, Finland, and Sweden; and time dummies for different yearly intervals. All other variables are as described in Appendix B. The outcome equation includes year and industry dummies, where industries are defined using the Fama and French 48-industry classification. T-statistics are reported in parentheses and the symbols ***, **, * denote statistical significance at respectively the 1%, 5% and 10% levels.

Dependent variable	Log of Enterprise Value (Censored obs.)			Deal Value is Disclosed (Uncensored obs.)		
	(1)			(2)		
Private-to-Private	-1.506	(11.69)	***	-2.061	(30.38)	***
Divisional	-1.335	(14.02)	***	-1.450	(21.02)	***
Financial-to-Private	-1.028	(7.00)	***	-1.921	(24.80)	***
Secondary	-0.382	(3.55)	***	-1.588	(22.21)	***
Distressed	-2.376	(17.87)	***	-1.490	(17.67)	***
Financial sponsor	0.100	(0.75)		0.563	(8.75)	***
Public Inv. Fund	-0.086	(1.23)		0.318	(8.03)	***
Indep. Private Fund	0.379	(5.62)	***	-0.146	(4.11)	***
MBO	-1.543	(13.09)	***	-0.069	(1.18)	
Sponsor > 20 deals	0.890	(19.82)	***			
Syndicated	0.126	(2.81)	**	0.204	(9.41)	***
U.S. dummy	0.543	(10.16)	***	-0.453	(18.84)	***
Continental Europe dummy	0.326	(4.74)	***	-0.606	(22.32)	***
Scandinavia dummy	0.084	(0.75)		-0.752	(16.59)	***
1970-1984 dummy				0.555	(5.55)	***
1985-1989 dummy				0.407	(7.21)	***
1990-1994 dummy				0.359	(7.70)	***
1995-1999 dummy				0.359	(12.89)	***
2000-2005 dummy				0.346	(16.40)	***
Heckman's Lambda	-1.459	(3.83)	***			
Intercept	4.777	(11.66)	***	1.206	(13.55)	
Industry dummies	Yes					
Year dummies	Yes					
N	8,535			23,032		